Brains Inventing Themselves
Choice and Engaged Learning
Conrad P. Pritscher

Neuroscience has found that neuroplasticity of brain cells allows brains to invent themselves. Remodeling of brains can be facilitated by schools and universities. What may be done to accelerate that positive inventing so as to prepare for rapidly accelerating change? As an IBM advertisement reads: “It is time to ask smarter questions.” This book helps the reader do that.

What is worse than being blind to something? “Being blind to your blindness” says Eric Haseltine who has worked for both Disney and the National Security Agency.

Being blind to what our brains can do is slowly changing. Brain researchers recently found that we can now be our own subjects of brain experimentation. Research shows how one can change one’s brain by changing one’s mind.

In her 2010 high school valedictorian speech Erica Goldson courageously said: “The majority of students are put through the same brainwashing techniques in order to create a complacent labor force working in the interests of large corporations and secretive government, and worst of all, they are completely unaware of it.”

This book shows professors, teachers, parents, and interested citizens how students can become aware and reach higher levels of consciousness.
Brains Inventing Themselves
This book series is dedicated to the radical love and actions of Paulo Freire, Jesus “Pato” Gomez, and Joe L. Kincheloe.

Cultural studies provides an analytical toolbox for both making sense of educational practice and extending the insights of educational professionals into their labors. In this context Transgressions: Cultural Studies and Education provides a collection of books in the domain that specify this assertion. Crafted for an audience of teachers, teacher educators, scholars and students of cultural studies and others interested in cultural studies and pedagogy, the series documents both the possibilities of and the controversies surrounding the intersection of cultural studies and education. The editors and the authors of this series do not assume that the interaction of cultural studies and education devalues other types of knowledge and analytical forms. Rather the intersection of these knowledge disciplines offers a rejuvenating, optimistic, and positive perspective on education and educational institutions. Some might describe its contribution as democratic, emancipatory, and transformative. The editors and authors maintain that cultural studies helps free educators from sterile, monolithic analyses that have for too long undermined efforts to think of educational practices by providing other words, new languages, and fresh metaphors. Operating in an interdisciplinary cosmos, Transgressions: Cultural Studies and Education is dedicated to exploring the ways cultural studies enhances the study and practice of education.

With this in mind the series focuses in a non-exclusive way on popular culture as well as other dimensions of cultural studies including social theory, social justice and positionality, cultural dimensions of technological innovation, new media and media literacy, new forms of oppression emerging in an electronic hyperreality, and postcolonial global concerns. With these concerns in mind cultural studies scholars often argue that the realm of popular culture is the most powerful educational force in contemporary culture. Indeed, in the twenty-first century this pedagogical dynamic is sweeping through the entire world. Educators, they believe, must understand these emerging realities in order to gain an important voice in the pedagogical conversation.

Without an understanding of cultural pedagogy’s (education that takes place outside of formal schooling) role in the shaping of individual identity—youth identity in particular—the role educators play in the lives of their students will continue to fade. Why do so many of our students feel that life is incomprehensible and devoid of meaning? What does it mean, teachers wonder, when young people are unable to describe their moods, their affective affiliation to the society around them. Meanings provided young people by mainstream institutions often do little to help them deal with their affective complexity, their difficulty negotiating the rift between meaning and affect. School knowledge and educational expectations seem as anachronistic as a ditto machine, not that learning ways of rational thought and making sense of the world are unimportant.

But school knowledge and educational expectations often have little to offer students about making sense of the way they feel, the way their affective lives are shaped. In no way do we argue that analysis of the production of youth in an electronic mediated world demands some “touchy-feely” educational superficiality. What is needed in this context is a rigorous analysis of the interrelationship between pedagogy, popular culture, meaning making, and youth subjectivity. In an era marked by youth depression, violence, and suicide such insights become extremely important, even life saving. Pessimism about the future is the common sense of many contemporary youth with its concomitant feeling that no one can make a difference.

If affective production can be shaped to reflect these perspectives, then it can be reshaped to lay the groundwork for optimism, passionate commitment, and transformative educational and political activity. In these ways cultural studies adds a dimension to the work of education unfilled by any other sub-discipline. This is what Transgressions: Cultural Studies and Education seeks to produce—literature on these issues that makes a difference. It seeks to publish studies that help those who work with young people, those individuals involved in the disciplines that study children and youth, and young people themselves improve their lives in these bizarre times.
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Choice and Engaged Learning

Conrad P. Pritscher
A C.I.P. record for this book is available from the Library of Congress.

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Pritscher has the gift of taking philosophical complexities and making them clear. As a teacher, I understand exactly what I need to do. This book is exciting because it is not only about theory, but also about action. I understand that to become a good teacher I need to become a learner, and act like a learner at all times. My mind needs to be open and I need to guard against closed mindedness. The book is not only interesting and worthwhile for what Pritscher has to say but he also has the unique gift and talent for picking the wisest of thoughts from prominent thinkers that in turn make us more profound and wise beings ourselves.

Carlo Ricci,
Professor, Nipissing University, Canada,
Author and Editor
Journal of Unschooling and Alternative Learning.

Deftly navigating a course between the Charybdis of rigid standardization and high stakes testing and the Scylla of narcissistic individualism, Pritscher draws on a synergistic blend of Eastern and Western philosophy, empirical research and personal experience to advance a compelling vision of education guided by the transcendent values of open and collaborative inquiry, responsible individuality and caring community, reciprocal respect and social justice. It is an absorbing vision where the potentially centrifugal forces of individual freedom and passion are both nurtured and constructively channeled by the dynamics of informed dissent and rational democratic discourse. Once again, at his best, Pritscher is characteristically know-ledgeable and nuanced, compassionate and clairvoyant, catalytic and convincing.

Tom Kelly,
Associate Professor of Education and Coordinator of Adolescent and Young Adult Teacher Education Program,
John Carroll University.

In my work as a child therapist I constantly strive for a capacity I call receptivity. Conrad Pritscher takes this very idea, and in a prodigious journey through science, philosophy, spirituality, and education he makes the case that we should assist teachers in cultivating a receptive disposition so that they may become open, and hence preserve the precious openness that constitutes a child’s imagination. Conrad argues for a mildly disorienting education experience, one that tolerates uncertainty and ambiguity, and one that accepts and builds on a child’s need to know. Conrad is not naïve to the ways of the world, and he understands all too well the importance of docile bodies and obedient minds to the functioning of a technocratic society. However, in the great tradition of Ivan Illich, Paul Goodman, Maxine Greene and so many others, Conrad can imagine a life otherwise, and we are fortunate that he has written this book so that others may partake of this vision and begin their own journeys toward undiscovered places and undreamt of possibilities in their own
lives, and hence in the lives of the children they can touch through parenting and particularly through teaching in receptive, skeptical, critical - yet always hospitable - ways.

Michael O’Loughlin,
Professor, Psychology and Education, Adelphi University.
Michael O’Loughlin, is author of “The subject of Childhood” (2009) and editor [with Richard Johnson] of “Imagining Children Otherwise” (2010).

Conrad Pritscher presents here a revolutionary vision of the future of education. We are taken on a fascinating and elegant exploration of physics, neuroscience, mathematics and philosophy, all in the service of the wonder and promise of the new mind. Teachers must read this book, not to make tinkering reforms to schools, but for the chance to recast themselves and their students as authentic learners, eager to lead freer, more extraordinary lives. Pritscher hopes for a “paradigm shattering event, a punctuated moment” that will profoundly alter compulsory schooling. With this book, the transformation of our discourse on learning has already begun.

Steven Taylor,
High School English Teacher, Bolton, Ontario, Canada.

“The premise and insights are fascinating!”

Rick Ayers,
Professor, San Francisco State University.

I am amazed, delighted and in awe!! What a wonderful job stringing together so many of the key concepts that are so fundamental to true education and are now overlooked by our education policy makers, publishers, administrators, parents, etc.... You have an amazing command of facts, resources, key ideas. And I am amazed at how you have succeeded in communicated so many ideas I’ve struggled to communicate for decades. I LOVE YOUR THOUGHTS & WORK!!! Jon Madian, Author 509 493 1898

“In this far-reaching and thought-provoking book, Pritscher pinpoints precisely where schools go wrong; pushing children to accumulate data is pointless, since children can access data as well as anyone at the touch of a button. Pritscher argues instead for the re-invention of education as the exquisite development of multi-modal inquiry and open-minded interpretation, as children engaging in continual wondering and in creating their own connections. Every educator needs to hear Pritscher’s message.”

Kellie Rostlad,
Professor, Arizona State University.
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Michael O’Laughlin, Carlo Ricci, Tom Kelly for their time, effort, support, brilliance, and wisdom.
FOREWORD

How should we live our lives? How can we become more open-minded? How can we become our own oracles? How should we raise children? What does education look like and how can we approach that vision?

Once again Pritscher does not disappoint. In this book he tackles profound and substantive questions and provides laudable insights. Once again, after reading this book from Pritscher I have come away enlightened, wiser and inspired. In part, this book addresses and provides ways to act in response to insightful questions about how to live, Pritscher writes, “Included in that how to live, is how to live interestingly, how to live remarkably, and how to live in important ways (that which student’s could profitably be freed to study)” (p. 124). Is there anyone who does not or should not grapple with these most central questions?

Do you know that feeling when you come to the realization that what you thought was the case is not the case? Imagine now having that happen over and over again. That is exactly what it feels like to read Pritscher’s book. It challenges, redefines and the best part is that you come away with a sense of hope and goodwill, a sense of confidence and a desire to act because you know that the world can be better and you now know what your part in making this happen is.

Pritscher makes the point that acting as if we know things that we do not, works against our abilities. This argument put forward by Pritscher needs to be taken seriously if we are truly interested in what he calls “comprehensive thinkers” (p. 11). If we are interested in education, rather than training, we can no longer pretend that we know more than we do.

In preparing us for what his book is about, Pritscher tells us “What follows is an attempt to provide conditions, not for new categories, but to open minds to the possibility of the power of knowing more tentatively: knowing with less certainty: knowing in a way that may help us know more by being more receptive to what now seems near impossible” (p.10). If we want to move from training to education and from schooling to learning we need to open our minds rather than continue to close them. Throughout this book Pritscher offers ways toward becoming more open minded.

The book is not only interesting and worthwhile for what Pritscher has to say but he also has the unique gift and talent for picking the wisest of thoughts from prominent thinkers that in turn make us more profound and wise beings ourselves.

He challenges us to open our minds and embrace discrepancy, which he defines as “an event that varies from a student’s expectations” (p. 31). Discrepancy is not something to fear, but is a unique opportunity and gift to approaching open mindedness. For example, to reach a point where one understands that something can be and not be is to approach open mindedness. Discrepancies are not necessarily conundrums that need to be solved but opportunities for growth, creativity and imagination.

Pritscher has the gift of taking philosophical complexities and making them clear. For example, when he compares bishops to teachers, clarity emerges. He
quotes Time Magazine, “bishops see themselves as ‘teachers, not learners: truth cannot emerge through consultation’” (p. 50). In writing this, as a teacher, I understand exactly what I need to do. This book is exciting because it is not only about theory, but also about action. I understand that to become a good teacher I need to become a learner, and act like a learner at all times. My mind needs to be open and I need to guard against closed mindedness.

In making the connection that wisdom is acting, Pritscher hits on what is the most important result that mind opening has to offer. Whether we are thinking about acting as a learner, as a way to understand something, or whether we are thinking about acting as a way to bettering the world, it needs to be through acting that this happens; ultimately acting is the key. In other words, in the case of the former, the best way to learn something is to do it, to act out a genuine situation, and in the case of the latter the best way to better the world is for each of us to act better. So, this highlights the importance of acting.

Education is not the same as schooling and if we are interested in open mindedness, our schools need to change. Pritscher writes, “We need more confidence in our judgment in order to remove the outdated thinking our schools and universities often generate” (p. 100). We need to have the courage to open our minds beyond what is already there. We cannot simply continue to replicate and train in absolute ways, but we need to embrace uncertainty. By doing this, “If we accept uncertainty, perhaps we can become more educated. The free atmosphere is quite uncertain, and accepting that uncertainty helps one become educated, rather than merely trained” (p. 104).

We cannot continue to see people as objects, cogs and resources to exploit, but we need to see them as ends in themselves. We need to embrace Pritscher’s assertion that “One is freer when one is one’s own authority, and, paradoxically, one learns to be one’s own authority by being one’s own authority. One cannot be one’s own authority when one is constrained” (p. 104). Similarly, if we want responsible adults we need to give children the freedom to be responsible. We learn to be responsible, by being responsible, not by being coerced or bribed or punished into conforming to a discourse that may or may not be best, but merely habitual.

We need to understand that indoctrinating people into thinking a certain way works against open mindedness and ultimately against our best interests. To move forward we need diversity and innovation and creativity and imagination, not the status quo; especially, when we take a second to reflect on what the status quo is for so many people, beings and nonbeings within our world, universe and beyond. Pritscher writes, “Rather, a fuller and more just democracy could more easily develop where differing views will be heard when unhampered by the social pressures to think in a certain way. Some fundamentalist régimes tend to promote social pressure to think in a certain way” (p. 108). This clearly works against open mindedness, and ultimately our best interests.

After all, “Certain absolutes in our history have turned out to be “not true” (the earth is not the center of the universe, the atom is not the smallest particle, the universe is not only composed of matter and energy)” (p. 111). For any of us to
believe that what we believe most fundamentally is unchallengeable and eternal is to not understand what it means to have an open mind.

In quoting recently deceased historian, Howard Zinn, Pritscher writes: “If there is going to be change, real change,” he [Zinn] said, “it will have to work its way from the bottom up, from the people themselves. That’s how change happens.” Pritscher goes on to say that “Education, rather than training, will be needed for changing from the bottom up” (p. 113). This is not something that we should fear, but it is something that we should all embrace. We need to understand that if we want the world to be a different place, then all we have to do is to act in the way that we want the world to be, and then the world will simply be that place that we want.

If we respect humanity, we need to allow people to be their own individuals. Pritscher says, “As a result of not knowing what everyone else knows, we will be able to examine how to live in more ways, many of which may be more interesting, remarkable, and important than the narrow ways which are promoted by the representational, dogmatic, identity view; (the view which most schools and universities now follow). This identity view promotes obedience to authority rather than developing one to be one’s own oracle” (p. 121).

Many believe that the goal of a university is to create new knowledge, and I would argue that should be an important goal for all education. Currently, Pritscher argues that “Schools now want to make too much sense by only teaching what everyone else knows. This excessively socializes students into only knowing the common opinion which leads to groupthink” (p. 121). And of course group think is akin to close mindedness and very far removed from open mindedness, and now more than ever we need imaginative, creative responses that are generated through open mindedness and by having people author their own lives.

Open mindedness is not for the weak but for the courageous. Pritscher reminds us that, “It takes courage to go outside the bounds of what is commonly known because, in days past, going outside the boundaries of what the “experts” know has given rise to burnings at the stake, and other severe admonitions” (p. 122).

Imagine if schooling were not confined to prison like, undemocratic institutions and that schooling approached education. What would this look like? In giving us a response to this question Pritscher quotes Peter W. Cookson Jr., Yale University, who states: “…If we stop thinking of schools as buildings and start thinking of learning as occurring in many different places, we will free ourselves from the conventional educational model that still dominates our thinking” (p. 125). It’s as simple as that. Those with open minds recognize that learning and education is not limited to a certain space, place and curriculum, but is everywhere, everything, all the time. What would happen if we took this insight seriously? If we truly understood, just this one thing?

I see myself as a child advocate and I believe that, unfortunately, children are among the last acceptably oppressed group and that this shame needs to stop. Pritscher, quotes Marian Wright Edelman as saying, “If we don’t stand up for our children, then we don’t stand for much” (p.125).
By understanding mind openers and what it truly means to be open minded we could help make a world where young people can be their own oracles. “This writing plunges into the notion that focusing on nonsense (doing things differently) can help generate more sense” (p.6). By turning sense to nonsense and nonsense to sense we can help young people to unfold and embrace their creativity, imagination which in turn will help build a better more respectful world.

Again, open mindedness will help, “Those prone to fear and aggression, and those intolerant of ambiguity often think substances and statements about substances are the same and are permanent” (p. 130), to see things differently, and seeing things differently is something that we desperately need given the pain and suffering that so many experience.

Learning, most would agree is important, but just as important, we also need to embrace unlearning. As Pritscher says, “At times, unlearning may help people see bigger chunks of reality” (p. 134). He goes on to say that, “To many of us are far too uncomfortable with uncertainty. Our growing needs for certainty since Aristotle have contributed to our favoring definition as opposed to infinition (infinition implies a high degrees of openness including nonsense). Of course, we need balance between infintion and definition. As a result of moving excessively toward the side of definition, we have tended to close ourselves, and our experience, and our relations with other people and events” (p. 134).

Anyone who has taken the time to be with children knows how inquisitive and how much they love learning. The sad reality is that formal mainstream schooling stomps on this enthusiasm. As Pritscher says, “That something needs to change is clear. When we find so many students not loving learning, not being inquisitive, and wanting to be told what to do, we can conclude that we have serious problems in our schools and society” (p. 145). The solution to this problem is not a complex one. Unschoolers, natural learners, free schoolers, those who have attended learner centered democratic schools, and all of us who understand what it means to spend time in the zone doing what it is we love to do, understand the solution, as does Pritscher. He writes, “Schools need to focus on developing more awareness, freedom, self-direction and mind opening” (p. 157).

We need to allow people to define for themselves, to become their own oracles, to unfold in ways that are most natural for them. We need to understand and embrace Wittgenstein’s notion of language games and understand that the world is not something that is independent from us and there to be discovered but that we construct the world. When we use language and words we need to understand the dangers of trying to define words in a precise way. Pritscher writes, “Excessive defining is another way of saying “preventing growth and development,” or preventing conditions whereby a person can decide for one’s self” (p. 147).

I would like to end with powerful questions asked by Pritcher:

Is it fair to ask whether the environment outside of school and university is 90% richer than school and university in terms of generating “powerful
learning experiences”? How many powerful learning experiences are deferred or lost as a result of schools and universities turning off a love of learning, openness, and natural inquisitiveness? (p. 162)

And finally, a way that will get us to open mindedness is to avoid thwarting the love of learning and do what is more natural: “See in college how we thwart the natural love of learning by leaving the natural method of teaching what each wishes to learn, and insisting that you shall learn what you have no taste or capacity for.” (p. 167)

My wish is that many people will read this book with an open mind and embrace Pritscher’s hopeful way of living life.

By Carlo Ricci,

Author and Editor of JUAL (Journal of Un-schooling and Alternative Learning) (Un-schooling is student directed learning)

http://www.nipissingu.ca/jual
PROLOGUE

Harvard researchers recently were able to reverse the aging process in mice. British mathematician, Roger Penrose, claims evidence suggests that what we think our universe may be but one in perhaps an unending, coexisting succession of undetectable universes. If Penrose’s evidence is not “noise” or instrumental error, it could radically change the way we think about our universe.

A New York Times editorial asks: “What do we do about these possibilities?” The answer: “To marvel at them and be reminded, once again, that we live in the universe—however we define it—that contains more wonders then we can begin to imagine.”

Sir Arthur Eddington said: “The universe is not only stranger than we imagine. It is stranger than we can imagine.” Ray Kurzweil predicts that in less than 20 years we will have machines with the equivalent mental power of human beings. Ten years after that, machines will be 1000 times smarter. Kurzweil predicts we will have 1000 times more technological change in this century than the last. The first hundred years of technological change will occur by 2014. The next hundred years of technological change will occur by 2021. Faster change will occur after that.

Schools and universities are not preparing students to live in a time of rapidly accelerating change? Do we have time to wait to change what happens in our classrooms when rapidity of change is accelerating?

Average students in free schools showed they improved on national standardized tests at two and a half times the national rate. (Education Revolution, August, 2010.) Free schools, in an ungraded atmosphere, encourage students to explore what the student finds remarkable, interesting, and important. They are not tuition free.

Mathematicians have created an infinitesimal to help calculate. An infinitesimal is too small to measure. Wouldn’t it be nice if philosophers, psychologists, educators, other scientists, and ordinary citizens were attempting to create the opposite of an infinitesimal; something too large to measure which may amount to an educator’s equivalent to a mathematician’s zero. This educator’s zero could help educators accelerate higher level learning the way the invention of zero, near 750 CE, accelerated operations in math.

These recent findings and projections in some fields have not yet been noticed by many who operate classrooms in schools and universities. Often unconsciously running through school activity is an obedience to authority frame. This frame holds that it is fine to be free as long as one obeys authority. This frame may need questioning since throughout the ages, the common thread of great thinkers has been that education is that which helps people become freely self-directing (their own authorities). As Thomas Jefferson suggested, education is that which will help one decide for oneself what will secure or endanger one’s freedom. As Albert Einstein said, education is that which helps one think something that can’t be learned from textbooks.
PROLOGUE

Even in the light of traditional state tests which reveal the achievement range of seventh graders is from grade 3 to grade 13, our National Governor’s Conference believes there should be national standards of content. Forty States already bought into that idea. Might it be helpful to notice that most fields now contain a virtual infinite body of content? Recently, discovery of planets in our galaxy moved from 1 to 500: and the satellite Kepler finding a possible 1200 more.

Within the last year astronomers have projected the universe contains $300,000,000,000,000,000,000,000$ stars. (Many more than previously projected). Paradoxically, one astronomer predicted that the same number of human cells now exist in all humans on earth. Another astronomer suggested that our universe may be tilting, indicating another universe with gravitational pull.

Many teachers and professors for well over a hundred years have operated on the basis of mastery of content as a major goal of schooling. Many teachers and professors don’t see themselves as dispensers of information yet that is what they are. They often do not notice the information is often unasked for. Nor do they often notice the unconscious coercion when students are forced to follow the obedience to authority frame, even if it prevents students from developing their own, possibly more illuminating frame. Controlling students is often a common mindset in schools and universities which continue to promote the dispensing of information. The dispensing of unasked for information makes many teachers and professors the equivalent of, as William Pinar mentions, mail carriers.

Neuroscience has recently revealed the neuroplasticity of brain cells. Brains can invent themselves. Remodeling of brains can be facilitated by schools and universities. Reversing negative conditions produced by earlier debilitating experiences is an aspect of brain inventing. What may be done to accelerate that positive inventing so as to prepare for rapidly accelerating change? As an IBM advertisement reads: “It is time to ask smarter questions.”

What is worse than being blind to something? David Segal mentions Eric Haseltine, “who has worked for both Disney and the National Security Agency, draws on the findings of evolutionary psychologists to explain to corporations why they are often unable to see opportunities that are right in front of them. (Haseltine said) ‘Although we like to believe we know what is going on in our brains, we know almost nothing about what is going on inside them, he says. We’re not only blind to certain things, but we’re blind to the fact that we’re blind to them.’” That is changing.
CHAPTER 1

LEARNING AND PROCESS

Nonsense to Sense

“The only means of strengthening one’s intellect is to make up one’s mind about nothing—to let the mind be a thoroughfare for all thoughts.”

John Keats

Accessing information has recently changed. Brad Johnson and Tammy Maxon McElroy reported that children entering kindergarten now are way beyond their grandparents in their exposure to information (two years after their grandparents graduated from high school). Through a cell phone, a ten year old child can access information more efficiently than our own government could 50 years ago. About this change, Louise Stoll & Dean Fink stated: “Many of our schools are good schools, if only this were 1965.” By giving more attention to some recent neuroscience and psychological research, teachers and professors can help students understand more by improving eager, engaged student learning.

Many teachers and professors would disseminate less un-asked-for information if they noticed how fast the process of accessing information is changing. The increase is accelerating. What may increase eager, engaged learning is classroom activity designed to enhance and increase students’ knowing they know without someone else telling them? Schools and universities often neglect engaged and eager learning. Unless the dissemination of un-asked-for information by teachers and professors is reduced soon, later dissemination reduction may arrive long after it is relevant. We are quickly approaching a critical mass of classroom activity producing disinterested learners who need others to tell them what and how to think. The notion of national standards is evidence that many educators have made up their minds thus reducing the strength of one’s intellect according to Keats and others.

Engaged brain inventing increases self-directing consciousness, imaginative behavior, and 6th level learning. Sixth level learning accelerates brain self-invention (more on p. 21). Not all teacher or professor un-asked-for “telling” needs to be eliminated (perhaps only 90%). What is said here relates to courses which purport to be “educational.” “Training” courses can get away with much more telling and less self-directed open inquiry. The often unnoticed problem is that most school and university courses now “train” instead of “educate.” “Training” often produces a product: mark, diploma, job, money. As Bel Kaufman said: “Education is not a product: mark, diploma, job, money, in that order; it is a process, a never-ending one.” An educated person can think something that can’t
be learned from textbooks whereas a “primarily trained” person often cannot. Neuroscience and other research offer help.

The aim of The 2010 World Congress of Neurotechnology in Rome is to turn different fields of neuroscience—neurosurgery, neuropsychiatry, neuro-oncology, neuro-economics etc., into a unified tech-driven force. The attempt is to create powerful new means of finding out more about the brain and how it is best used.

The brain often unconsciously blocks unnecessary sensation but how the brain lets one know what to give attention in various contexts is not known. Students often know what they find remarkable, interesting, and important. Neuroscience researchers when studying patience, humility, altruism, and concern for the common good, note these are qualities often associated with what many call wisdom. It is often agreed that wise people not only know what is important and what isn’t. Wise people do the important things that need doing. The wise avoid doing that which leads individuals and groups away from doing what is in their best interest. Michel de Montaigne said: “Even if we could be learned with other men’s learning, at least wise we cannot be except by our own wisdom.”

Wisdom research implies that an unwise person is often impatient, overly aggressive, excessively proud, and selfish. How might schools and universities modify what they do to help students develop wise, discerning judgment? Discerning judgment is difficult to define but developing it might require a closer look at connections between various brain functions, including how these functions affect a closer integration of one’s intellect and one’s will. Willpower is needed to strengthen the intellect as Keats suggests. Making up one’s mind about nothing (openness) takes conscious effort.

Jane Lee reports Stanford University researchers said people fall into two groups. “One that believes willpower doesn’t run out—that is ‘unlimited.’ The second group believes that a person could run out of willpower after a hard task like taking a final exam—because willpower is ‘limited.” Ms. Job, visiting professor at Stanford, from the University of Zürich, said the finding that willpower is not a limited resource is “pretty powerful conclusion.”

Students use of will power is not often directly fostered by universities. Academically Adrift, by Richard Arum and Josipa Roksa show that according to their analysis of more than 2,300 undergraduates at twenty-four institutions, “45 percent of these students demonstrate no significant improvement in a range of skills—including critical thinking, complex reasoning, and writing—during their first two years of college.”

While neuroscience is getting us closer to considering aspects of wisdom, Stephen S. Hall (Wisdom: From Philosophy To Neuroscience) reminds us that we are still way removed from creating a definition for a curriculum designed to develop wisdom. Benjamin Franklin wrote in poor Richard’s almanac: “What signifies knowing the names, if you know not the nature of things.” Many classrooms, at all levels, now primarily focus on knowing names. “If you can name it you know it,” no longer holds.

The nature of an event such as learning grammar, or algebra, or how laws are enforced, only makes sense in terms of the larger context in which one is learning
grammar, algebra or how laws are enforced. We need further exploration of
broader contexts, and even of the context of contextualizing. This leads one to
exploring matters such as the nature of nature. This is somewhat ambiguous and
vague as you notice. Not giving attention to these matters, however, at least at
times, can be debilitating to learners and citizens.

No one has perfect knowledge. Hall suggests what distinguishes “mere
intelligence” from “wisdom” is the wise person has the ability to exercise good
judgment in the face of imperfect knowledge. Justice Potter Stewart’s comment
about pornography: “We know it when we see it even if we can’t define it,” also
applies to wisdom. Awareness (consciousness of self, others, and things) is at the
heart of wisdom. Noticing what one does, rather than what one says, is a way to
notice wisdom.

Hall reports that neuroscience research is backing Montaigne’s statement that
cheerfulness is a sign of wisdom. Aspects of wisdom such as “delayed
gratification” and “emotional regulation” have been studied, but wisdom is given
little attention. A few exceptions are: Paul Baltes (Planck Institute), Ursula
Staudinger (Berlin Wisdom Paradigm), and Robert Sternberg’s research.

Sharon Begley (excellent science editor of Newsweek, and author of Train Your
Mind: Change Your Brain: How a New Science Reveals Our Extraordinary
Potential to Transform Ourselves), and other brain researchers are reporting on
how we can change our brains by changing our minds. When we learn, we often
noticeably change our brains. Eager self-directed learning is projected to change
minds more readily. (Eager self-directed, broad learning is projected to be at the—
soon to be mentioned—higher (levels 4-6) of the van Rossum and Hamer levels of
learning and knowing.

Some neuroscience and wisdom research shows that a wise person knows when
to follow rules, and also knows when rules do not apply (when and how to follow
the spirit of the law rather than only the narrower letter of the law). Such knowing
is self-directed knowing. Brains inventing themselves are self-directing and are
often eager to continue learning. Scientism will later be seen as not following the
spirit of laws (making up one’s mind too quickly).

Psychologist Rick Hansen states that in the last 20 years we have doubled our
understanding of the brain. Much of this research was not more widely known until
the last few years resulting in many teachers and professors lack of awareness of it.
As a result, some teachers and professors are still practicing myths about teaching
and learning. Paying attention to one’s present experience has been found to be
helpful for noticing what is important. Neuro-economics researcher Paul Zak found
that people who share and experience gratitude release oxytocin, a hormone known
to relieve stress and improve immune function.

Brain researchers are now reporting there is no “self” in the brain. “Self”, some
researchers say, is not a noun and should more accurately be called “self-ing” as an
activity the brain does. Hansen reports that “self-ing” is found in 50 areas of the
brain. Those areas also do other things. Hansen reports that when we privilege
“self” we find human suffering. Einstein thought the true value of a human
being can be found in the degree to which one liberates oneself from one’s self.
(Self-inventing, self-direction, and brains inventing themselves will become more understandable in the light of what is yet to be said.)

Relating these notions to schooling, Hall reports that several years ago, the office of undergraduate admissions at Tufts University, asked prospective students to submit an essay as a means to being accepted at Tufts. Hall reports that this “offered a window into their potential for creativity, practicality, critical thinking, and wisdom. The questions tend to be whimsical but with lots of rhetorical room to roam. One year, the question was ‘what is more interesting: guerrillas or gorillas.’”

Another year the question began by quoting astronomer Edwin Hubble: “‘Equipped with his five senses, man explores the universe around him and calls the adventure science,’ and then asked, ‘using your knowledge of scientific principles, identify an adventure in science you would like to pursue and tell us how you would investigate it.’ The student essays reveal many of the qualities we have been talking about: the ability to put oneself in somebody else’s shoes, the ability to see social needs larger than oneself, the ability to see the big picture, the ability to understand the situations, and truths, change with the passage of time. These abilities, needless to say, are utterly opaque in standardized testing.” Until recently, wisdom researcher Robert Sternberg was Dean of Tuft’s Arts and Sciences College.

Few teachers and professors consider providing conditions whereby they can help their students invent their brains, but Jaron Lanier, a major architect of Microsoft’s programming, considers such self-inventing. What kind of teacher does it take to help students invent their own brains? Einstein thought such an excellent teacher is one who could help students think something that could not be learned from textbooks.

A wide variety of educators agree that the teacher is the crucial element in a student’s learning environment. Many also agree that good and effective teachers make positive “connections” with students. This connecting with students is a difficult to define process. The connecting process often includes teacher characteristics of humor, genuineness, vulnerability, and transparency. These characteristics, while difficult to measure, can be recognized. Because they are so difficult to measure, schools and universities often do not provide conditions whereby those characteristics can be developed.

It is projected that teachers whose brains have invented themselves make better connections with students. It is also projected that those “connecting” teachers more readily provide conditions whereby their students’ brains eagerly invent themselves.

How can students be successful if teachers are frequently experiencing burnout? Contributing to teacher burnout are requirements to follow authority which often includes rigid distribution of un-asked-for information and excessive testing. Chinese teachers, until recently, were asked to distribute much un-asked-for information. They are changing.

I do not know if Secretary of Education, Arne Duncan, would agree with Chinese Premier Wen Jiabao who recently told officials: “We must encourage students to think independently, freely express themselves, get them to believe in
themselves, protect and stimulate their imagination and creativity...Students don’t only need knowledge; they have to learn how to act, to use their brains.” In the United States, teachers of teachers’ lesson plans rarely include experiences designed to have students become creative and think for themselves. Duncan’s “Race to the Top” requires states to use test scores in teacher’s evaluation. This is unreliable and will not produce better teaching/education for the 21st century.

Arne Duncan’s mission statement, published on the Internet does not deal with self-direction, open inquiry, or love of learning. He sounds less open than Premier Win Jiabao in Duncan’s mission statement on the Internet which says: “Promote Student Achievement and Preparation for Global Competitiveness by Fostering Educational Excellence and Ensuring Equal Access.” Sounds like old, mindsets which lack vision for the 21st century. Jeevan Vasagar reported in Education Revolution that the Guardian quoted a British Think Tank which said: “The most successful schools ignore government advice and set their own standards for effective teaching.”

About covering content, Physicist Brian Greene, “The Hidden Reality, writes about knowing “the art of knowing what to ignore.”

The learner must decide what to ignore. Knowing what to ignore relates to Einstein’s idea of education as that which helps one think something that can’t be learned from textbooks. Some teachers and professors, in their attempts to cover content, do not seem to know what to ignore. This is especially true when teaching to the test. It is also true when a teacher or professor believes that his superiors or authorities in his field think delivery of detailed content is often essential. Green, when talking about multiple universes, a multi-verse, demonstrates that excessive detail can trivialize and prevent understanding of a possible larger picture such as a multi-verse.

Top-performing school systems such as those in Finland, recruit, develop, and retain the top third of their college graduates to be educators. “In the United States, 23 percent of new teachers come from the top third of their graduating class. That number drops to 14 percent in high poverty schools. Can anyone teach? Researcher McKinsey’s report says, ‘In the United States, the answer has been ‘yes.’ In top education nations, the answer is a definitive ‘no.’’” Better teachers know what to ignore.

According to Einstein, imagination is more important than knowledge, and thinking for oneself requires imagination. Thinking for oneself is often partly facilitated by mentally taking things apart (analyzing) and by putting them together (synthesizing). Powerful learning may also be partly facilitated by allowing events to be as they are (noticing more fully “what is the case” before attempting to change it). We may soon come to notice we are doing much more “training” than “educating.” The reduction of excessive training would allow more time for imaginative brain invention and development of thinking for oneself. Imaginative thinking often arises from awareness of who one is, and what one is doing.

We will help students better learn for 21st-century living when schools and universities accentuate education while placing training in a secondary position. “Training” often deals with content-centered, clearly defined, easily measured
skills. “Education” deals with the difficult to define, and therefore, difficult to measure, broadly fluid events such as brains inventing themselves, self-direction, open inquiry, love of learning, self-awareness, and honing judgment. Because of schools’ needs for accountability, the difficult to measure events are infrequently considered. Temporarily reducing some overly clear accountability will increase higher level accountability in the long run.

Wise people often know the making of a variety of gains involves some risk-taking. Wise people also know the greatest gains arise from the investing in one’s own brain. This writing illustrates the need for intelligent, wise risk-taking when dealing with difficult to define events. At the heart of education are difficult to define events, such as open inquiry, and brain self-invention. As was said about pornography, we know it when we see it. The same may be said for open inquiry and brains inventing themselves.

Jaron Lanier, partner architect at Microsoft Research said: “To the degree that education is about the transfer of the known between generations, it can be digitized, analyzed, optimized and bottled or posted on Twitter. To the degree that education is about the self-invention of the human race, the gargantuan process of steering billions of brains into unforeseeable states and configurations in the future, it can continue only if each brain learns to invent itself. And that is beyond computation because it is beyond our comprehension. Learning at its truest is a leap into the unknown.” The unknown is often neglected because it is seen as “nonsense.”

Self-invention of the human race starts with each of us self-inventing one’s self. Inventing one’s self is also beyond clear definition because it is an ongoing process. It is difficult to measure but there are clues that can help us move to notice it. Lanier is saying much including aspects of brain invention through moving from nonsense to sense. Self-awareness is increasing consciousness. Some creative students are sometimes seen as anarchist, especially when seen by those who closely follow the obedience to authority frame.

Sue Shellenbarger of the Wall Street Journal stated: “Americans’ scores on a commonly used creativity test fell steadily from 1990 to 2008, especially in the kindergarten through sixth-grade age group, says Kyung Hee Kim, an assistant professor of educational psychology at the College of William and Mary. The finding is based on a study of 300,000 Americans’ scores from 1966 to 2008 on the Torrance Tests of Creative Thinking, a standardized test that’s considered a benchmark for creative thinking.” (Dr. Kim’s results are currently undergoing peer review to determine whether they will be published in a scholarly journal.

Creative students “tend to have above-average spontaneity, boldness, courage, freedom and expressiveness, Dr. Kim says. So they sometimes behave like little anarchists.”

Also described here is the un-risky narrowness of many schools and universities when they overly train at the expense of developing self-directing, open minded, inquisitive students. When the process of brain inventing/eager learning is paramount, the honing of judgment and self-direction may be securely had with wise risk-taking. The risking relates to developing the semi-unknown self-
direction, and openness to experience. Learning with higher levels of consciousness (as researched by van Rossum and Hamer) also involves worthwhile risk-taking.

Excessive training fails to integrate skills into the general skill of self-directing, open inquiry from which relevance and importance can be better noticed. Teachers and professors will have difficulty in educating unless and until they are open to take calculated risks in helping students learn to be self-directing, open-minded people who eagerly learn. It is difficult to find a self-directing, open-minded, inquisitive person who is not also, a wise citizen. There is no one correct way to calculate wisely, but there are clues that may be considered.

One clue is recent research by van Rossum and Hamer which elaborates on “orders of consciousness” to help generate new ideas for innovation in teaching and learning. This writing attempts to demonstrate the power of choice for increasing students’ levels of consciousness. This writing also suggests teachers and professors would noticeably improve learning for the 21st century if the students were provided conditions to invent their brains and raise their consciousness by exploring what students find remarkable, interesting, and important.

Consciousness researcher, Dr. Gullio Tononi, said: “Consciousness is nothing more than integrated information.” The NY Times said information theorists measure the amount of information in a computer file or a cellphone call in bits, and Dr. Tononi argues that we could, in theory, measure consciousness in bits as well. When we are wide awake, our consciousness contains more bits than when we are asleep. For the past decade, Dr. Tononi and his colleagues have been expanding traditional information theory in order to analyze integrated information. It is possible, they have shown, to calculate how much integrated information there is in a network. Dr. Tononi has dubbed this quantity phi, and he has studied it in simple networks made up of just a few interconnected parts. How the parts of a network are wired together has a big effect on phi. If a network is made up of isolated parts, phi is low, because the parts cannot share information.”

Abigail Zuger, M.D. mentions brain research by Carl Schoonover, Columbia, Ph.D. Candidate, who said: “We can tell what was on the monkey’s mind by inspecting its brain. The picture forms a link, primitive but palpable, between corporeal and evanescent, between the body and the spirit. And behind the photo stretches a long history of inspired neuroscientific deductions and equally inspired mistakes, all aiming to illuminate just that link.”

Sharon Begley said: “But what neuroscientists don’t know about the mechanisms of cognition—about what is physically different between a dumb brain and a smart one and how to make the first more like the second—could fill volumes.”

She reported that Jaakov Stern, neuroscientist, Columbia University said: “Greater cognitive capacity comes from having more neurons or synapses, higher levels of neurogenesis (the creation of new neurons, especially in the memory-forming hippocampus), and increased production of compounds such as BDNF (brain-derived neurotrophic factor), which stimulates the production of neurons.
and synapses.” Begley said: “Both neurogenesis and synapse formation boost learning, memory, reasoning, and creativity.”

Begley reports on three ways to help build new neurons: 1. Exercise, 2. meditation, and 3. playing some complex videogames. She said: “Exercise gooses the creation of new neurons in the region of the hippocampus that files away experiences and new knowledge. It also stimulates the production of neuron fertilizers such as BDNF, as well as of the neurotransmitters that carry brain signals, and of gray matter in the prefrontal cortex. Exercise stimulates the production of new synapses, the connections that constitute functional circuits and whose capacity and efficiency underlie superior intelligence.”

As students move to higher levels of consciousness, they often move toward becoming their own authority. Teacher direction shifts to student direction. Teacher structuring shifts to student structuring. Responsibility for student learning shifts from teacher to student. Teacher choice moves toward student choice. Teacher classroom management moves toward student self-management. (see Taylor’s note on p. 254). A brain inventing itself helps one become one’s own authority. Hermann Heidegger thought a teacher’s job was to assist students to find out on their own. Einstein thought an educator is one who helps students think something that can’t be learned from textbooks.

A student’s brain inventing and level of consciousness partly depends on what the student experiences in classrooms. What students experience partly depends on school and teacher goals. Van Rossum and Hamer’s research includes empirical studies on epistemology, student thinking, teacher thinking, educational policy and staff development. They have developed a six-stage developmental model indicating qualitatively different ways students and teachers view learning and good teaching. They have reviewed research from many disciplines and their study underpins the empirical evidence of over 650 students and teachers. Unique ways of meaning making and brain invention are shown in these six levels of learning and knowing.

This writing provides ideas on how to develop student’s higher level learning, imagination, and awareness. It elaborates on an integration of what is considered multi-faceted intelligence with emotional/social intelligence. Multidimensional experience is also discussed. Being one’s own authority is here used as the power to influence or command thought, opinion, or behavior. Becoming one’s own authority goes with inventing one’s own brain. This inventing helps one create elements of a successful, happy life where one is in command of one’s self, and is not easily fooled, or manipulated.

The van Rossum and Hamer six ways of learning and knowing are characterized by increasing complexity of thinking. Teachers and professors when “covering content,” often ask students to operate at the two lowest (least complex) levels of consciousness. The fourth level of learning and knowing is called self-authorship. This fourth level is tantamount to John Dewey’s “self-direction” which includes brain self-invention.

Van Rossum and Hamer state there is ample evidence to show that higher education is not attaining its own stated goals of education (self-authorship). The
same may be said for K-12 schooling. Van Rossum and Hamer say one explanation could be that “many teachers in higher education have not themselves reached the minimum required way of knowing thus preventing those teachers from constructing a path for students to be educated at that self-authorship level” (probably also true for K-12). Canadian scholar, David G. Smith stated: “Why does so much educational ‘research’ today seem so unenlightening, repetitive and incapable of moving beyond itself? Wisdromly, the answer must be ‘because it is paradigmatically stuck’, and cannot see beyond the parameters of its current imaginal space.”

This lower level teaching and learning may occur because many current professors and teachers were heavily influenced by B.F. Skinner and his emphasis on conditioning/training. As a result of paying attention only to what can be easily sensed, many professors and teachers do not now pay attention to mindfulness, wonder, eagerness to learn, and self-direction. What cannot be directly sensed is difficult to measure and clearly define. Events such as openness, and love of learning also fall into that difficult to measure category. As a result, schooling and much university classroom activity deals primarily with “training” rather than developing higher levels of consciousness. This early excessive training also keeps some teachers and some professors at lower levels of consciousness.

The van Rossum and Hamer epistemological model: “provides clear signposts on the developmental education highway and has proven its worth as an instrument for curriculum design, measurement of epistemological development and as a tool for staff development.” These ideas are included in their book, The Meaning of Learning and Knowing, Sense Publishers, 2010.

LEARNING AND INNOVATION

Context must be considered regarding choice of classroom activity. If a student in a math class is given the choice of doing the required even-numbered problems or odd-numbered problems, the choice is not a choice affecting higher-level learning.

In later chapters, comments about Zen and Zen meditation are included to show that higher levels of learning are connected with Zen practice. Sindya N. Bhanoo reports that “those who mediated for about 30 minutes a day for eight weeks had measurable changes in gray-matter density in parts of the brain associated with memory, sense of self, empathy and stress. M.R.I. brain scans taken before and after the participants’ meditation regimen found increased gray matter in the hippocampus, an area important for learning and memory. The images also showed a reduction of gray matter in the amygdala, a region connected to anxiety and stress. A control group that did not practice meditation showed no such changes.” (Jan. 2011, Psychiatry Research: Neuroimaging.)

Were we conscious of other possible choices, school improvement and eager, engaged learning would more likely occur. The obedience to authority frame unconsciously limits our choices. Psychologist Pratt recently mentioned the brain fires 40 times a second when involved with a conscious event. One researcher said we can be conscious of 120 bits per second. Another said the figure is 2000 bits per
second. Pratt mentioned that the brain is firing 40 million times a second for unconscious/subconscious events. Another brain researcher said 98% of what a person “is doing” is unconscious.

Much schooling at all levels often deals with isolated parts where the phi is low. The van Rossum and Hamer research shows when learning at levels 4-6, there is increased consciousness. They say that many teachers and professors do not teach for increase in consciousness because their training has led them to think and act at the lower three levels (with more isolated parts and less phi).

Tononi thinks “Simply linking all the parts in every possible way does not raise phi much. Networks gain the highest phi possible if their parts are organized into separate clusters, which are then joined.” Dr. Tononi said he “does not think it is a coincidence that the brain’s organization obeys this phi-raising principle.”

It is interesting to note that one researcher stated that one human brain, “can make more connection combinations than there are elementary particles in the universe.” The brain’s 200 billion neurons can make trillions and trillions of connections. Tononi says his model explains why epileptic seizures cause unconsciousness. Unconsciousness arises from many neurons turning on and off together in a synchronized manner. He says: “Their synchrony reduces the number of possible states the brain can be in, lowering its phi.”

There is much less brain synchrony, more disorder, when one counts back from 100 by sevens. The disorder/lack of synchrony, may be a condition for the brain to make more connections. When one is dealing with disorder/complexity/perplexity/functional discontinuity, there is often a gap in one’s knowledge structure. The mental gap occurs as a result of a discrepant or perplexing event. One is often motivated to close the gap because of mild discomfort in “not knowing.” The brain first deals with the disorder (nonsense-less brain synchrony) perhaps allowing for more phi (more connections), one or more of which may close the mental gap (to make more sense—see a bigger picture—a larger chunk of reality).

Learning at the 4th level on the van Rossum and Hamer scale often occurs as one openly inquires to build a concept or set of concepts to explain a discrepancy. When one inquires, one gathers information in searching to satisfactorily explain a discrepancy. Attempting to make connections, at first perhaps in a semi-chaotic way, “throwing out mental lines,” (in the Deleuze and Gautari sense), not randomly, but also not highly ordered, so that a possible connection may be made.

When teachers and professors are willing to allow students to be wrong, there is some repair of our nation’s schools and universities. About repair, psychotherapist Ruth Bettelheim recently said: “Our classrooms are outdated, functioning like a mid-20th-century factories… Contemporary neuroscience has confirmed that children’s learning is largely dependent on inherent interest, emotional engagement, social interaction, physical activity and the pleasure of mastery.”

F. Scott Fitzgerald said: “The test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time and still retain the ability to function.” Schools and universities would generate higher level learning with a “both/and” open mind rather than an “either/or” (right or wrong) closed mind.
An open mind is an inquiring mind. The circles below signify concepts. The smaller circles signify low level concepts. The lines connecting the low level concepts to a higher level concept (larger circle) signify the process by which concepts are related (throwing out lines). Open inquiry throws out lines in all directions (experiments) and when connections are made, a higher level concept is formed. The larger the circle, the bigger the chunk that is understood. The top circle does not signify an endpoint, but rather, the point from which more lines are cast in order to create yet higher level concepts, reflecting larger chunks of reality.

The process by which concepts are related requires higher level cognitive functioning than the remembering of the concepts which the function generates. There is no end to open inquiry. The process is infinite and not fully understandable or conceptualizable. The process is continuous as in John Dewey’s notion of education as the “continuous reconstruction of experience.” Brain invention involves the continuous reconstruction of experience.
The New York Times, 9/17/10 reports: “Paul Howard-Jones, a neuroscientist who teaches in the graduate school of education at the University of Bristol in Britain, said: “Dopamine sends a ‘ready to learn’ signal to the brain, essentially priming it to receive new information pleasurably. His research has shown that children’s engagement levels are higher when they are anticipating a reward but cannot predict whether they will get it—or, as Howard-Jones put it to me, ‘when you move from a conventional educational atmosphere to something that more resembles sport.’”

During a classroom ungraded, open inquiry session, it is projected a student’s attempt to arrive at a powerful answer to a discrepancy often produces a dopamine flow (giving pleasure) in anticipation of arriving at knowing, without someone telling them they know.

Brain researcher, Jaak Panksepp said, (regarding the seeking circuitry of the brain) “…the system makes animals intensely interested in exploring their world that leads them to become excited when they are about to get what they desire.” Panksepp states that the seeking circuitry in the brain… “maybe one of the main brain systems that generate and sustain curiosity, even for intellectual pursuits…. In other words, wonderfully aroused, it helps fill the mind with interest and motivates organisms to move their bodies effortlessly in search of the things they need, crave, and desire.” The “it” is anticipation. Allowing one’s self to be puzzled helps generate anticipation of knowing a solution to what is causing the puzzlement/mental discontinuity. The mental discontinuity can function to help create a broader continuity (a larger connected chunk of reality). A student who explores what she finds remarkable, interesting, and important is more wonderfully mentally aroused and engaged. Teacher-telling doesn’t help exploration.

It is projected that brain inventing often occurs as a student is involved in closing a mental gap (open inquiry), not because of grades, degrees, or teacher/parent approval, but rather, because of intrinsic motivation.

The van Rossum and Hamer first level of learning relates to increasing knowledge by a teachers imparting clear, well-structured (easily measured) knowledge.

The 2nd level of learning is memorizing, again through a teacher transmitting structured knowledge.

Their 3rd level of learning is understanding/application with teaching being interactive and shaping (similar to Bloom’s 3rd level in the cognitive domain). The third level not only relates to understanding subject matter; the teacher also challenges the student to apply what students comprehend.

The 4th level of learning van Rossum and Hamer call “learning in the abstraction of meaning” where teacher and learner dialogue occurs. What the student wants to know is part of the dialogue.

The 5th level relates to an interpretive process of widening student horizons and personal development through dialogue teaching. Bridgeman’s “no holds barred” begins to apply here.

The 6th level includes growing self-awareness with mutual trust, authentic relationship, and caring between teacher and learner. The 6th level is projected to
most fully accelerate brain self-invention. The 6th level includes self-direction and personal development. The 6th is near the highest form of learning often coupled with the highest form of knowing. The highest form of learning is either unknown or can’t be said. Learning may be limited by time; otherwise learning is infinite.

The 6th level provides conditions whereby students can grow in self-awareness while being their own authorities. Their 6th level goes beyond Bloom and other hierarchies to integrate more than the cognitive, affective, and psychomotor domains. They do not mention that their 6th level of learning and knowing has many parallels to what Zen learners and Zen teachers do (and do not do)—more later. Most university and K-12 classes do not deal with the 4-6 levels of learning and teaching. Transforming schools and universities may occur if they did.

The American School Board Journal (May, 2010), said:

“Those with a vested interest in the education of American youth—in other words, everyone who has reached the age of reason—should read this book and share it with others.” (The book is Kelly Gallagher’s, Readicide.)

Gallagher argues that American schools are furthering the decline of reading. Specifically: “He contends that the standard instructional practices used in most schools are killing reading by much of what they value and do.”

Gallagher seems to be accurate. Had he extended his analysis to most teaching of most subjects, K–19, he may even have more potential to transform schooling. Taking what he says about reading and applying it to school and university learning generally, one sees that many schools and universities value the development of test-takers over the development of lifelong, inquisitive learners who love learning while inventing their brains.

He mentions a number of events including the notion that schools, and I might add many universities, “lose sight of authentic learning in the shadow of political pressure mandating the requirement of low levels of thinking so that students avoid thinking for themselves.” The Midwest Book Reviews states: “Readicide, is an intriguing look at many possible solutions to the problem of the decline of reading in American schools.” (September 2009)

What Gallagher is saying in Readicide applies to what may be called, “mindicide”. About 40 years ago, Silverman wrote how schools murder minds. By extending Gallagher’s thought about reading to most subjects, one can notice mindicide. Applying these ideas to those who wish to lengthen the school day, or the school year, we may say that if we are murdering minds with what we are now doing in classrooms, by lengthening the school day, or school year, we will be accelerating mind murdering.

The van Rossum and Hamer writing about the meaning of learning and knowing helps us see that we can teach and learn at levels 4-6, which include higher orders of consciousness. Teachers and many professors follow a mindset that tends to avoid natural learning for its own sake to help students become their own authority thereby reducing potential brain invention.
According to Gallagher, Read-i-cide is, n: “The systematic killing of the love of reading, often exacerbated by the inane, mind-numbing practices found in schools.” Mindicide is the systematic killing of the love of learning through the practice of inane, mind-numbing practices found in schools and many university classrooms.

Not only reading but also most higher-level learning is dying in our schools. Gallagher says: “Educators are familiar with many of the factors that have contributed to the decline—poverty, second-language issues, and the ever-expanding choices of electronic entertainment.” He suggests that it is time to recognize the death of reading. This writing suggests it is time to recognize the death of self-creation and higher level learning. Ideas to bring about a transformation of schooling at all levels are provided, so that 4-6 level learning and brain inventing results.

Microsoft’s Lanier said: “What is really lost when this happens is the self-invention of a human brain. If students don’t learn to think, then no amount of access to information will do them any good. I am a technologist, and so my first impulse might be to try to fix this problem with better technology. But if we ask what thinking is, so that we can then ask how to foster it, we encounter an astonishing and terrifying answer: We don’t know.”

Tangentially related are the recent findings that psychologists, economists and educators have found that paying money for learning involving medium to high level cognitive functioning or imagination, shows less learning than learning for intrinsic motivation. Some schools are paying students to learn. Intrinsic motivation has been shown to be superior for learning requiring higher cognitive functioning. Most university and K-12 classes do not capitalize on this intrinsic motivation. Merit pay for teachers has also been found to not increase student learning.

Edith Hamilton said: “It has always seemed strange to me that in our endless discussions about education, so little stress is laid on the pleasure of becoming an educated person, the enormous interest it adds to life. To be able to be caught up into the world of thought—that is to be educated.”

Expert projections of effectively good teachers are difficult to know. Elizabeth Green found that a graduate-school degree, a high score on the SAT, an extroverted personality, politeness, confidence, warmth, enthusiasm, and having passed the teacher-certification exam on the first try, do not predict whether one will be a good teacher.

Pat Wingert, Newsweek, reported: “Now when you talk to new teachers…their biggest complaint is that no one teaches them how to control a classroom…. But their professors never seem to get around to teaching “Keeping Kids Under Control 101.” When one learns to control oneself (self-direction), one will often find cooperation reduces the need to control others. Teacher ability to “connect” with students is important, but is rarely dealt with in teacher training. It is projected that some future teachers want to know how to control students because of the modeling of their previous controlling teachers and professors. Some future teachers may want to be teachers so that they may control others.
Self-authorship (a brain inventing itself) is self-control. Self-control comes from the practice of self-control which teacher control often prevents. Teachers, and most citizens, know that the reason for gaining knowledge of almost any kind is to help one make discerning judgments in their daily lives and jobs. If one has good judgment, they will often be self-directing. Self-direction has been stated by numerous respected educators as the primary goal of education yet schools often retard it.

It is difficult to become self-directing, when the environment in most classrooms is directed by others. Most colleges of education have “classroom management” in their curricula. The goal of classroom management is directing students; keeping students under control. The paradox is that one learns to become self-directing by being self-directing. One cannot be self-directing when one is controlled (other directed). One learns to invent one’s brain by inventing one’s brain.

Lanier also states: “At school, standardized testing rules. Outside school, something similar happens. Students spend a lot of time acting as trivialized relays in giant schemes designed for the purposes of advertising and other revenue-minded manipulations. They are prompted to create databases about themselves and then trust algorithms.” The economy, rather than learning, is fostered.

Most standardized testing requires excessive left brain student functioning. (Schooling often perpetrates left brain teaching.) The van Rossum and Hamer learning levels 4-6 require student whole brain functioning as brains invent themselves.

Good teaching often includes the enthusiasm of the teacher and the teacher’s desire to achieve his or her goals. Teachers and some professors are the only group of professionals who cannot choose their tools. The No Child Left Behind Law promotes “teaching to the test.” Many teachers and some professors do not control their curricula. The mindset of “teaching equals telling” is still common as a result of the obedience to authority frame.

It would be difficult to be enthusiastic about achieving a goal the teacher did not believe was worthwhile. When many teachers are teaching to have students pass standardized tests, the goal can be debilitating for the teacher, as well as the students. Goals for corporations rather than for the learner’s self-direction restrict teacher effectiveness. Teachers have expressed that unless they taught to the test, they would be fired. They also were highly unenthusiastic about teaching to the test. This lack of teacher enthusiasm contributes to student boredom, poor learning, no teacher/student connecting, and teacher burnout.

At the Perkins School for the Blind, Watertown, Mass., blind students are now fencing. The NY Times reports: “Cory Kadlik has never let being blind stop him from golfing, skating, learning martial arts or riding a dirt bike. He had his doubts when it came to fencing.” Some may say that blind people fencing is nonsensical. While 70% of blind people are unemployed, only 37% of blind people who are involved in athletics are unemployed. They are taking risks that schools and universities rarely do.

As Carlo Ricci said: “Anyone who has taken the time to be with children knows how inquisitive they are, and how much they love learning. The sad reality is that formal mainstream schooling stomps on this enthusiasm.”
Because content is growing so rapidly, and because we can’t tell exactly which content students will need to solve problems and live harmonious lives in the near future, let us consider not teaching to the test. Developing student resourcefulness and self-direction will better help students adjust to presently unknown future demands.

Susan Engel’s psychological research found: “There is also scant evidence that these tests encourage teachers to become better at helping individual children; in fact, some studies show that the tests protect bad teachers by hiding their lack of skill behind narrow goals and rigid scripts. And there are hardly any data to suggest that punishing schools with low test scores and rewarding schools with high ones improves anything. The only notable feature of our current approach is that these tests are relatively easy to administer to every child in every school, easy to score and easy to understand. But expediency should not be our main priority when it comes to schools.”

COMPUTERS NOTICING FEELINGS

Clive Thompson, Wired, November 2010, notes that computers are beginning to know what we are feeling. Computer scientist Beverly Wolf states that software was 80% accurate in sensing students’ moods. She says “if the student is in trouble emotionally or is frustrated, they’re not going to learn.” These projects are still in the lab but Thompson says gadgets like smart phones “are crammed with tech that’s right for detection.” (seemingly implying one’s mood). Thompson knows that moods are not always clear and that humans are often confused by moods, but he thinks computers eventually will accurately sense human feelings to help people learn. Will they be able to help students to openly inquire and grow to love learning? Probably yes.

Wired Magazine, Dec. 2010, said: “The lesson is that our computers sometimes have to humor us, or they will freak us out. Eric Horvitz—now a top Microsoft researcher and a former president of the Association for the Advancement of Artificial Intelligence—helped build an AI system in the 1980s to aid pathologists in their studies, analyzing each result and suggesting the next test to perform. There was just one problem—its provided the answers too quickly. ‘We found that people trusted it more if we added a delay loop with a flashing light, as though it were huffing and puffing to come up with an answer,’ Horvitz says.”

Except for classes that are clearly designed for “training” such as, how to fix washing machines, or repair a laptop computer—let us primarily focus attention on developing the student’s love of learning and open inquiry by providing classroom conditions whereby students can more readily invent their own brains. Students often will become self-directing if their teachers are, and if their teachers are free to avoid teaching to the test, and are free to use a wide variety of teacher tools of their choice.

An example of an apparent misunderstanding of inquiry is shown in a Marion Star article about Ohio State University professors who conducted a 2010 summer
workshop for teachers. An unusually large number of teachers and professors consider “inquiry” to be different and subordinate to learning “content” for passing tests. The article stated, “A group of Ohio high-school teachers participated in a workshop last week on an inquiry-based learning method that already has improved science test scores at one middle school. The training focused on how to encourage classroom discussion and experiments, rather than only textbook learning, and another workshop is scheduled for August on chemistry” (not inquiry). (The reporting may have been inaccurate.)

Inquiry is not a method for something else. Inquiring is one way of inventing one’s brain. Inquiry is a conscious use of consciousness (aware use of awareness). Inquiry is what created all fields and their content. Notice the primary goal of the workshop mentioned above is not development of student’s ability to inquire, but rather, to learn chemistry and to encourage classroom discussion and experimentation. Subordinating inquiry to content of various fields of science has been an unacknowledged school and university problem for more than 100 years. The process of inquiry is that which developed all science, and the content contained in any given field. Many teachers and professors have not yet noticed that content in any given field is virtually infinite. Certainly there is a hierarchy of ideas within various fields, but at the top of all fields is the process of open inquiry. Test scores are now more important than allowing brains to invent themselves by developing awareness and the ability to inquire.

When a teacher or professor uses inquiry to “teach content” they are often subordinating inquiry to the content of a given field. Using inquiry primarily for learning content is more appropriately called discovery learning where the students are to discover what the teachers have in mind, and what the textbooks include. It is this kind of thinking that keeps us thinking there is a box that we someday may get out of. There is no box. Any box is self-created. We are already out of the box when we openly inquire.

Open inquiry implies one does not know in advance the results of an inquiry. The use of functional discontinuity in the form of discrepant events in a freer, ungraded environment is a way to promote development of open inquiry, a love of learning, and self-direction. Freeing students to explore what they find remarkable, interesting, and important is a powerful way to learn. Open inquiry increases intelligence as Jean Piaget uses the term: “Intelligence is knowing what to do when you don’t know what to do.” Piaget’s notion of intelligence relates to Einstein’s notion of a liberal education (that which) “helps one think something that can’t be learned from textbooks.” When you are your own authority, you know what to do, when you don’t know what to do, and you can think something that can’t be learned from textbooks. Brain invention is involved.

Mental stuckness is similar to functional discontinuity. Keith Yamashita states: “Do you feel overwhelmed? Exhausted? Directionless? Hopeless? Battle torn? Worthless? Alone? These symptoms are what I call the serious seven—the seven most common indicators that you are stuck. If you are feeling one of these emotions, it’s likely you—or your organization—is stuck. I think one of the most interesting observations we gleaned from studying stuck teams is that successful
teams are often the ones that get stuck most often. And ambitious teams get stuck all the time. The difference between failure and breakthrough is perseverance.”

Functional discontinuity need not make one feel overwhelmed or exhausted but simply stuck. Being stuck and open inquiry are, unfortunately, avoided in university distance learning lecture classes as well as most K-19 classrooms.

May what Ilan Shrira said be used as evidence of mindicide of university teaching? He teaches developmental psychology to 300 (distance learning) at the University of Florida. He said he chose his field because of the passion of a professor who taught him as an undergraduate. But he thought it unlikely that anyone could be so inspired by an online course. NY Times reports: Univ. of Florida: “Like most other undergraduates, Anish Patel likes to sleep in. Even though his Principles of Microeconomics class at 9:35 a.m. is just a five-minute stroll from his dorm, he would rather flip open his laptop in his room to watch the lecture, streamed live over the campus network...

Across the country, online education is exploding: 4.6 million students took a college-level online course during fall 2008, up 17 percent from a year earlier, according to the Sloan Survey of Online Learning. A large majority—about three million—were simultaneously enrolled in face-to-face courses, belying the popular notion that most online students live far from campuses, said Jeff Seaman, co-director of the survey. Many are in community colleges, he said. Very few attend private colleges; families paying $53,000 a year demands low student-faculty ratios...

Colleges and universities that have plunged into the online field, mostly public, cite their dual missions to serve as many students as possible while remaining affordable, as well as a desire to exploit the latest technologies. At the University of Iowa, as many as 10 percent of 14,000 liberal arts undergraduates take an online course each semester, including Classical Mythology and Introduction to American Politics.

Mindicide kills higher level brain function. Learning at the 4th level on the van Rossum and Hamer scale often occurs as one openly inquires to build an explanation for a confusing discrepancy. When one inquires, one uses information in searching to satisfactorily explain a discrepancy. At first perhaps in a semi-chaotic way, “throwing out mental lines,” (in the Deleuze and Gautari sense), not randomly, but also not highly ordered, so that a possible connection may be made.

When a higher level connection is made to a discrepancy there is more order (sense) but not necessarily enough order to close the mental gap created by a semi-nonsensical discrepant event. Using groups of concepts to consciously throw out lines in many directions (exploring) may make a higher level connection, creating more brain development, while forming a bigger concept or bigger chunk of reality. Other higher-level connections/chunks may be connected by continually throwing out more “lines,” (testing various possibilities). There is a greater integration of more separate parts (more sense from nonsense) when brains function at higher levels.

As Gandhi said: “There is no way to peace. Peace is the way.” So too with inquiry. There is no way to inquiry. Inquiry is the way. If we trusted ourselves and
our students, we would provide less coercion and more freedom to facilitate open inquiry. Listening to a “distance lecture” on a computer screen tends to avoid student open inquiry while often producing zombies who are obedient to authority.

These open inquiry goals require teachers’ trust of students and students’ trust of the teachers. Trust is a part of one’s character, and about this Einstein said: “Most people say that it is the intellect which makes a great scientist. They are wrong: it is character.” May we say that it is not intellect that makes a great teacher, but rather, character which includes trust and openness?

Covey’s, Speed of Trust, which Christian Sarkar wrote about, states that trust is a function of both character (which includes integrity) and competence. If teachers and university professors trusted students, they would more often do what is done in “free schools”—not tuition free, but where students are free to explore, in an open, ungraded atmosphere, what the student finds remarkable, interesting and important. What is said by Covey about the trust dividends for business probably is true for student learning in schools and universities.

Covey states: “Trust is the one thing that affects everything else you're doing. It’s a performance multiplier which takes your trajectory upwards, for every activity you engage in, from strategy to execution. If you look at the nature of the world today, a foundational condition in Thomas Friedman’s book, Flat World, is the presence of trust…. In issue after issue, the data is clear: high trust organizations outperform low-trust organizations. Total return to shareholders in high trust organizations is almost three times higher than the return in low trust organizations. So we assert that trust is clearly a key competency. A competency or skill that can be learned, taught, and improved and one that talent can be screened for.” Trust is missing in school and university classrooms. In ancient Greece, where school was a place to play with ideas, trust was present. That is probably also true for ancient China and Japan.

About high trust organizations, Covey reports the following: “Information is shared openly. Mistakes are tolerated and encouraged as a way of learning. The culture is innovative and creative. People are loyal to those who are absent. People talk straight and confront real issues. There is real communication and real collaboration. People share credit abundantly and openly celebrate each others’ success. There are few meetings after the meetings. Transparency is a practiced value. People are candid and authentic. There is a high degree of accountability. There is palpable vitality and energy—people can feel the positive momentum. Cooperation is more valued than competition when trusting is high.”

In low trust organizations (most schools and universities) Covey reports a culture that reflects: “New ideas are openly resisted and stifled. People often feel unproductive tension—sometimes even fear. Mistakes are covered up or covered over. Most people are involved in a blame game, badmouthing others. There is an abundance of ‘water cooler’ talk. There are numerous ‘meetings after the meetings’. There are many ‘undiscussables.’

People tend to over-promise and under-deliver. There are a lot of violated expectations for which people make many excuses. People pretend bad things aren’t happening or are in denial. The energy level is low. Facts are manipulated or
distorted. Information and knowledge are withheld and hoarded. People spin the truth to their advantage. Getting the credit is very important.” Grading students is giving credit. Traditional schools and many university classes reflect a low trust culture whereas free schools reflect a high trust culture.

What kind of trust does the state of Texas School Board have when, as reported by the New York Times, March 2010: “After three days of turbulent meetings, the Texas Board of Education on Friday approved a social studies curriculum that will put a conservative stamp on history and economics textbooks, stressing the superiority of American capitalism, questioning the Founding Fathers’ commitment to a purely secular government and presenting Republican political philosophies in a more positive light.” In a 2010 survey of North Carolina teachers about trust and respect, 69 percent in 2010 vs. 70 percent in 2008—think that there is an atmosphere of trust and mutual respect in the schools. Thirty one percent of the teachers do not see an atmosphere of trust in schools. This is part of the school problem, but what is unstated is the mistrust administrators and teachers have for good and effective student learning, without requirements, grades, degrees, and without the pleasure of engaged learning. More support for the natural benefits of trust are seen in Dr. John Tierney’s research. He found: “Markets don’t work very efficiently if everyone acts selfishly and believes everyone else will do the same. You end up with high transaction costs because you have to have all these protections to cover every loophole. But if you develop norms to be fair and trusting with people beyond your social sphere, that provides enormous economic advantages and allows a society to grow.” I project the “norms” of trust which may be stated are formed after people risk “trusting.” NY Times (editorial 6/9/10): “Unless the court US Supreme Court) veers from its determined path, there will be no limit to the power of a big bankbook on politics,” said Tierney.

Competitiveness breads mistrust. Nobel laureate economist Paul Krugman thinks: “But let’s not kid ourselves: talking about “competitiveness” as a goal is fundamentally misleading. At best, it’s a misdiagnosis of our problems. At worst, it could lead to policies based on the false idea that what’s good for corporations is good for America.”

Trust is noted in a Kirsten Olsen workshop where she showed how several adult and young adult learners healed themselves from wounds of schooling, and what connections this has to an emerging new ideas on pleasure in learning. “While we know that choice, novelty, a sense of control, and the right amount of challenge are associated with pleasure and “flow” in learning,” it is projected to we can educate ourselves to better focus on pleasurable experiences in learning to optimize engagement, appetite and attention around class activity. What are some basic techniques for creating more optimal cognitive states for learning?

Evidence of mistrust is noted when Tripp Gabriel reported: “The extent of student cheating, difficult to measure precisely, appears widespread at colleges. In surveys of 14,000 undergraduates over the last four years, an average of 61 percent admitted to cheating on assignments and exams.” A Florida university uses movable video cameras during tests to focus on possible cheaters. Giving students
the choice to study what they find remarkable, interesting, and important eliminates this widespread problem.

Mohandas Gandhi’s statement: “There is no way to peace. Peace is the way,” may be extended to include: There is no way to trust. Trust is the way. A good teacher, among other qualities, may be one who trusts; even those students who lie.

Trust and high level student learning is rarely a first consideration for teachers and school administrators. An example of “student learning,” not being a major teacher concern, is noticed in a book for beginning teachers. The book opens: “Your teacher training may have provided sound theory and a collection of instructional techniques, but it’s often the practical details that can make day-to-day survival difficult in your first days, weeks, and years of teaching.” Notice, first and foremost is teacher survival rather than self-directed student learning, or just plain student learning. A close look at teacher and school administrator concerns shows that frequently, concern for student learning is secondary to ease of administration and control of students. Developing self-control/self-direction is difficult under such conditions.

Very different from survival is teacher revival of enthusiasm as teachers participate in a SEL (social and emotional learning) program. High trust is present. NY PS 112 reported an 11% increase in overall achievement after using the social and emotional intelligence program which generates and promotes high levels of trust among participants—teachers and students, teachers and teachers, and teachers and administrators. PS 112, reported an 11% increase in overall achievement after using the social and emotional intelligence program.

Texas school districts are attempting to improve their methods of engaging students in science learning. They have the hope of raising student’s science scores on standardized tests. An article stated that “experts say hands-on activities are the best way to teach science concepts.” The article also says the teachers did not have intensive science backgrounds or the time and resources necessary to develop and teach hands-on lessons. Our needs for certainty lead us to teaching definite science concepts, when science is much more than a set of concepts, and includes many uncertainties. Their goal is to have students score well on easily scored and measured standardized science tests. Such a goal may arise from failure to see science as a process. As Nobel laureate, Percy Bridgeman said: “Science is nothing more than doing your damnedest with your mind, no holds barred.” Science is inquiry—the process by which concepts are related supported by finding adequate evidence.

As Gloria Steinem said: The first problem for all of us, men and women, is not to learn, but to unlearn. Author Kathryn Schulz, in Being Wrong, states that knowing, as in knowing concepts, is ultimately, belief backed by strong evidence including other expert opinion. Unfortunately, too often the expert opinion now holds the teaching of science is teaching of science concepts when perhaps more accurately, the teaching of science would be better equated with developing a student’s ability to openly inquiry.

Self-direction arises from education which is beyond training. Bran Ferran, Co-Chairman and Chief Creative Officer, Applied Minds, gave an example of
self-directed, imaginative intuiting (and free thinking that can’t be learned from textbooks) when he said: “This is what I mean by the idea of Einstein—the potential for an exceptionally creative individual to inspire unlimited generations of children to become great contributors and role models themselves, over and over again. It is the intellectual equivalent of the nuclear chain reaction which might very well be the most powerful force most of us will never experience.”
“Try not to become a man of success but a man of value.” Albert Einstein

Alice asked the Cheshire cat: “Tell me please, which way ought I go from here? And the cat replied: “That depends a good deal on where you want to get to.” Where one wants to go can result from a fundamental value judgment. Fundamental value judgments are impossible to logically refute. If, however, as Einstein suggested, there is agreement on certain values and goals, “an exchange of ideas is often useful for determining the manner by which these goals may be met.” We use logic on the values (givens) we hold. The values themselves are most often pre-logical. Unstated school goals now are training students to obey authority so that our economy flourishes by providing trained workers for corporations. Schools and many university classes are not often developing students to be self-directing, open-minded generalists who make discerning judgments.

What values do schools hold when schooling is for more schooling? A Dec. 2010 ASCD Newsletter said: “Elementary schools promote college as the end goal.” While education is for more education, it is unfortunate when training is often the primary goal of schooling, that schooling seems to be for more schooling. San Diego and New Haven were mentioned in that article. It helps to educate instead of “only train” when goals of developing self-direction, love of learning, and open inquiry are primary. Of course some training is needed to be educated, but education has been neglected because of excessive “training” which fosters more certainty because of easier measurement.

As Gallagher stated about readicide: “The standard instructional practices used in most schools are killing reading by much of what they VALUE and do.”

School problems may arise from excessive “training” and an imbalanced valuing of the “obedience to authority” frame. If a group values high degrees of the obedience to authority, then their schools often promote conformity and certainty, thus reducing risk-taking. Frequently, following the strict obedience to authority frame, one shows one has made an unshakable fundamental value judgment from which inflexibility often results.

What puzzles some scholars is that the great thinkers throughout the ages from pre-Socratics to Plato, from Aristotle through the Renaissance, and to today, seem to foster education with open inquiry rather than high degrees of obedience to authority. The obedience to authority frame promotes only static security whereas the open inquiry, self-direction frame promotes growth and positive development. While I cannot prove the obedience to authority frame contributes to excessive learning of trivia, many of a powerful elite group seem to want more static security than growth.
If we strictly followed the obedience to authority frame, we would still be paying taxes to England without representation, and we may still think the sun circles the earth. This obedience to authority frame promotes a debilitating desire for more certainty. By focusing on open inquiry, this excess is avoided.

Values determine goals and goals lead to a means to achieve goals. Assumptions underlying the human sciences are used to determine value. If what we do as a society is determined by what we value, and if what we value is at least partially determined by what we assume, it appears that we need to more closely look at our assumptions if we are to change what we do.

Two basic goals for sound living and learning, on which many would agree, were suggested by Albert Einstein: 1. “Those instrumental goals which should serve to maintain the life and health of all human beings should be produced with the least possible labor for all. 2. The satisfaction of physical needs is indeed the indispensable precondition of a satisfactory existence, but in itself is not enough. In order to be content, men must also have the possibility of developing their intellectual and artistic powers to whatever extent accords with their personal characteristics and abilities.” Other goals such as gaining meaning from experience, facilitates development of self-direction. These goals can help schools and universities better develop students for 21st-century living by opening student’s minds and allowing brains to invent themselves.

Those two goals, if accomplished, could increase meaning in our democratic society by including more cooperation and reducing wasteful, self-serving competition. There now seems to be wide agreement that schools and universities can do much more to develop intellectual and artistic powers. Artistic powers are still neglected with excessive emphasis on science, technology, engineering, and math.

It is presumed that development of intellectual and artistic powers can help achieve other democratic goals. Self-serving competition has created societies with vast distinctions between the rich and poor, including rich schools and poor schools, and rich countries and poor countries. It may help to notice and ask why and how inequalities could more readily be made more equal.

Schools and universities now give most attention to preparing students for jobs, and to making sure students are obedient to authority. Schools and universities have made mistakes as evinced by many events including test scores showing American students being noticeably behind many other industrialized countries. (Noticing what Costa Rica and Finland have done may help us.) Many teachers and professors continue to ask their students to think at the lowest cognitive level (memory). Remembering pieces of information is easy to measure, permitting us to be more certain. Richard Rohr has spoken of wanting certainty as our original mistake. Avoiding mistakes arises from including a gross happiness product with a gross national product as is now done in several countries. With more self-directing education, we have a better chance of including a gross happiness product in the United States. Einstein thought: “Perfection of means and confusion of ends seem to characterize our age.”

Wholeness producing experience is often not now fostered by even the great American universities (except The Univ. of Michigan). In a C-span broadcast about
his new book, The Great American Universities, Jonathon Cole, former provost of Columbia University, held that the great American universities are great because they are built with the right structures arising from right values. Cole talked about the importance of free inquiry and academic freedom for university professors, but he did not speak of developing student open inquiry, love of learning, and self-direction. He implied university professors are to continue to dispense information. Such dispensing, when it is the primary classroom activity, often reduces student inquisitiveness, freedom, self-direction, and open inquiry.

If questioned, Cole might say that the stated values of student love of learning, open inquiry, etc. are givens and need not be stated. However, they are not givens and they do need to be stated because university professors and K-12 teachers often do not have developing student love of learning, open inquiry, and self-direction in their plans for lessons. As was said, if there is agreement on certain values and goals, an exchange of ideas is useful in determining the means by which these goals may be achieved.

Our values have shifted so that we now, first and foremost, want big corporations to be content. Everything else, including what goes on in schools and university classrooms is often designed to serve big corporations and a powerful elite.

Cole spoke of open, free communication, free inquiry, and peer reviews in hiring, promotions and firing professors, but he did not mention such freedom for students. Preventing student freedom is coercion which many teachers and professors do not notice because it is so common. As Carlo Ricci said: “Youth are the last oppressed group.”

The APA Monitor reports on the University of Michigan fall, 2010 semester’s theme of “What makes life worth living?” The article states that positive psychology research shows that work, love, play, and service to others makes our lives rich and fulfilling. They state it is not material goods that fulfills us. The Baltes and Staudinger research on wisdom also alludes to these qualities of wisdom.

The University of Michigan is offering special courses, workshops, lectures and other events under this theme. Christopher Peterson, Ph.D., who is directing the semester, along with two other professors, states this topic of “what makes life worth living” is a way to teach students about positive psychology and for students to think about what makes them truly happy. The University will also host art and poetry competitions around that theme, and student dance groups will offer related workshops and free performances. Their intention is to encourage an “alternative spring break” that involves service. The Univ. of Michigan seems far ahead of many educational institutions.

Peterson states: “There is, of course, no single answer to the question of what makes life worth living,” our hope is to underscore the importance of the question and a variety of possible answers.” The Austrian writer and poet, Barronness Marie von Ebner Eschenbach said: “To be content with little is hard. To be content with much is impossible.”
CHAPTER 2

COMPARING TEACHERS TO MAIL CARRIERS

It helps to notice that many teachers and university professors are often fond of disseminating single answers to problems. Those single answers are often found only in very simple, often disconnected and trivial problems. Such dissemination often goes with training (not education).

Times are different but schools often remain the same. Recent findings show what is now called “dark flow” causing an unexpected gravitational attraction of matter beyond the observable universe. An astrophysicist said this would possibly indicate that the laws of the universe are not universal throughout the universe as is now thought. Physics and Cosmology are now full of wonder and potential change. Wouldn’t it be wonderful if school and university classes were similarly full of awe and wonder about what makes life worth living, and about what higher level learning might be.

My interviews with numerous university and K-12 students reveal that the current activities of universities and schools show that grades and degrees are far more important than developing student love of learning, open inquiry, finding what makes life worth living, and development of self-direction. Until grades, degrees, and learning for jobs are outgrowths of student open inquiry, student love of learning, and student self-direction, our universities and schools may produce unthinking, conformist, order followers who may not know what makes life worth living.

A semester observing one of these great universities revealed (with about half the classes) a continual distribution of the products of professor research. In other words it was the research and much of the same old distributing information that makes universities great according to Cole. Development of self-direction has waned with the distributing of information as the primary goal of teaching.

Diane Ravitch and Chester Finn, former conservative thinkers with the U. S. Department of Education, have recently changed their thinking. Ravitch recently said the No Child Left Behind Act now seems to be used for testing for its own sake: She said: “Accountability, as written into federal law, was not raising standards but dumbing down the schools.” She now thinks schooling is becoming overly market-based (that sounds like making big corporations content).

Finn’s thinking has also changed. He recently said: “Standards, in many places, have proven nebulous and low,” … ‘Accountability’ has turned to test-cramming and bean-counting, often limited to basic reading and math skills.” Finn, when talking about the old public school system said: “I say let’s blow it up.” A partial blow up could give teachers significantly more authority. In a recent survey of 43,000 Maryland teachers, 75% feel they have little authority. Once the teachers have more authority, they would be in a position to grant more authority (freedom) to their students.

Ravitch has come to believe the No Child Left Behind Act is perpetuating “a cramped, mechanistic, profoundly anti-intellectual definition of education.” William A. Harris, President of the Ohio Council for the Social Studies recently said: “Most people know that if it’s not tested, it’s not taught.” Harris teaches history and government at Cedarville High School in Cedarville, Ohio.
He said: “It’s the continued marginalization of social studies that we’re seeing, not only in our state, but nationwide.”

Let us consider how to be more conscious of the products of our school and university classes. School and university structures arise from what we value. More consciousness of what is occurring in classrooms, at all levels, can help students invent their brains. This greater consciousness amounts to learning to think something that can’t be learned from textbooks. With better noticing, much will fall into place. Van Rossum and Hamer elaborate on this. As does Re-opening Einstein’s Thought: About What Can’t Be Learned from Textbooks, and Einstein and Zen: Learning To Learn.

In Mind and the Brain, Sharon Begley and Jeffrey Schwartz say: “Through mindfulness you can stand outside your own mind as if you are watching what is happening to another person rather than experiencing it yourself…. Mindfulness requires direct willful effort, and the ability to forge those practicing it to observe their sensations and thoughts with a calm clarity of an external witness…. One views his thoughts, feelings, and expectations much as a scientist views experimental data—that is, as a natural phenomenon to be noted, investigated, reflected on and learned from. Viewing one’s own inner experience as data allows (one) to become, in essence, his own experimental subject.” Notice the need for willpower in what they say. Schools and universities could profitably allow and encourage students to be their own experimental subjects, and attempt to more directly develop willpower (an aspect of inventing one’s mindful brainl). This best occurs in a freer, ungraded, responsive atmosphere.

Some of what is experienced when one is one’s own experimental subject cannot be counted. As Rick and Bill Ayers state in Teaching the Taboo, “schools promote a flat world where things get counted, or, as one notable education scholar and professor told us, everything that exists, exists in some amount, and so everything must be measurable. We asked him about love, hope, beauty, joy, imagination, and possibility, and he said we were being foolish. The ‘measure of man’ is the impossible ideal, the mis-measure of humanity the inevitable outcome.”

Regarding the use of words, outdated training has led experimental psychologists, more than clinicians, to want excessive certainty/clarity much as Rudolph Carnap and the Vienna Circle wanted excessive certainty many years ago. Such an excess may have prompted Albert Einstein to state: “Modern science when measured against reality is primitive and childlike.” About certainty, Einstein said: “The laws of mathematics insofar as they are certain, do not relate to reality, and in so far as they relate to reality, they are uncertain.”

While ignoring evidence is a problem, doing one’s damnedest with one’s mind, at times, may help one ignore what may be primitive and childlike. To be excessively certain, one may robotically follow research findings without considering other nuances difficult to verify. This writing offers some evidence and notions which will help one notice that what was evident may not now be as evident as it once was. Let us put on hold William Shakespeare’s thought: “There is nothing either good or bad but thinking makes it so.”
What Richard Rohr calls our “original sin” (mistake) has implications for what goes on in school and university classrooms. Noting the mistakes generated by the original mistake may help one more powerfully learn to know one knows, without someone else telling one he or she knows. Part of the original mistake is to overemphasize the classical/intellectual side and de-emphasize the artistic/romantic side. Schools and universities are now overemphasizing with extra governmental assistance for teaching science, technology, engineering, and math. Imbalance results.

Even some prominent conservative critics, like Finn, recently stated that we have neglected disciplines other than math and science. This over-emphasis on one side is an imbalanced negative condition. Allowing for more uncertainty and doing reasonable, calculated risk-taking can bring about a better balance so that more quality learning and living may be had by all within a reasonable time.

There is little risk in being certain. Taking risks provides an “opportunity” to be wrong. Kathryn Shultz (Being Wrong: Adventures in the Margin of Error) states: “Far from being a moral flaw, it (being wrong) is inextricable from some of the most humane and honorable qualities: empathy, optimism, imagination, conviction, and courage. And far from being a mark of indifference or intolerance, wrongness is a vital part of how we learn and change. Thanks to error, we can revise our understanding of ourselves and our ideas about the world.”

When we want to be certain we often hold fixed absolute standards by which to judge rightness and wrongness. These absolute standards have been heavily rejected by a variety of researchers. The “more certain” scientific standards are, the more easily they are falsified, which makes verification easier and more certain. This often leads to scientism.

These social standards often relate more to values and taste. Schultz states: “We all know that matters of taste are different from matters of fact; that standards of right and wrong apply to facts but not to preferences.” We often forget that we have preferences for some facts over others. Many teachers and professors have preferences for those that are more easily defined and measured. (those with which we can be more certain about—one type of stem—science, technology, engineering, and math—as they are often taught. The old school mindset continues to promote that which is more certain. (later—for stem cell type of stem learning.)

Our schools and universities have trained us to be enamored with certainty. We have been trained to believe “being wrong is bad.” This writing offers views from variety of sources fostering powerful learning and knowing as being more tentative. Research shows that if we focus excessively on security, little growth arises. When one is slightly less secure or—taking more calculated risks—, we can move towards greater growth and development. Taking risks is a vital part of how we learn and change. This can be done while still maintaining adequate security.

An example of an old school mindset is Mike Anderson in his book about teaching, (ASCD Internet Site) states: “It’s important to make sure we are clear about what kind of goal setting we mean here. We are talking about clear, meaningful, observable goals. If a teacher’s goal is to, (according to Anderson) “make science lessons more inquiry-based so that students have more academic
engagement,” he thinks the goal—“can’t really be measured easily,” and therefore
is not a productive goal. Inquiry, openness, and self-direction are not easily
observable. We can however know them when we see them as the Berlin Wisdom
Paradigm has helped us notice wisdom even though wisdom is not easily defined
or measured.

Anderson is wrong for today’s schooling. Anderson’s view is an outdated
mindset that approaches scientism. I suggest we have tried most easily observable
methods and teaching activities and have found them ineffective for educating
(while many may be useful for training in clearly defined skills far removed from
the general ability to self-direct). Brains inventing themselves do not easily or
clearly arise.

The importance of this point of easily measured goals versus general goals of
self-direction, and helping students decide for themselves is crucial. I project that
Anderson’s old school mindset did not work in 1965, and will not work today
when students access information very easily. Kathryn Schultz (Being Wrong)
implies that it would be worthwhile to take the risk of generating goals that are not
easily measured.

The Associated Press reports that Chicago Schools are sending its first class of
“at risk” students to college. Unfortunately, if risk-taking helps us avoid excessive
certainty, the other non-at-risk students would be better off if school and university
classrooms were riskier places. Riskier places would allow them to be less certain
and more open to mistakes. Consequently they may have a greater chance of
learning to be more imaginative and mindful.

As in John Milton’s, The Tailor Re-tailored, educators may need re-educating,
and riskier environments to allow for less certainty. Riskier classrooms (those
where less certainty is acceptable) can simultaneously be places where there is
greater chance of an educator being re-educated (being more vulnerable and
involved in the continuous reconstruction of experience in a more tentative
environment where learning at levels 4-6 flourishes).

Many noted thinkers over a 2500 year period think optimal learning is facilitated
by developing student curiosity, love of learning, self-direction, and open inquiry.
Developing those abilities helps balance our intellectual/classic and our
artiastic/romantic sides. What would it take to have widespread agreement about
this kind of rebalancing being a desirable goal for schooling? While we would not
be as certain of measuring those goals (self-direction etc.) as we are of measuring
whether students remember the capitol of the states, our mental functioning
(consciousness) would probably be far ahead of where we would otherwise be. The
temporary risk and extra uncertainty can help make us van Rossum and Hamer
level 4-6 learners who better know what makes life worth living.

Some school systems state they want students to: 1. develop curiosity, 2.
develop love of learning, and 3. develop open inquiry. A number of schools with
those quality goals have specific content sub-goals which often prevent the
accomplishment of the major goals. Those sub-goals encourage teachers to give
students information before students have questions, thereby failing achieve those
broader goals. Rarely are those goals (developing curiosity, love of learning,
self-direction, and open inquiry) seen on teachers’ or professors’ daily lesson plans. Those quality goals are sometime stated in school system’s printed material more for “show” than for helping students become more self-directing. The No Child Left Behind Act often inhibits the promotion of wonder, self-direction, and open inquiry. It promotes the obedience to authority frame.

The excessive un-asked-for teacher-telling continues often because teachers and professors have a habit of telling students what teachers and professors think students need to know. Society expects that, teachers and professors often expect that, and students are programmed to expect that they are to listen to un-asked-for-information (as though a student would not know unless the student was told). Teaching to the test has become common. This teaching to the test continues when recently it has become clearer that almost any discipline includes an almost infinite amount of information. Subtle, intricate and willful use of information, rather than simply remembering information is that which helps people capitalize on curiosity, developing a love of learning, self-direction, and open inquiry.

A variety of recent research on brain function and learning indicates other ways teachers and professors can better help students extensively and intensively learn when rapidity of change is considered. Dr. Cohen Kadosh, Current Biology, (11/5/10) thought transcranial direct current stimulation—might be helpful to the 20 percent of the population that has moderate to severe numerical disabilities “dyscalculia.” “Daniel Ansari, a neuroscientist at the University of Western Ontario in Canada, told National Geographic News he doesn’t expect the treatment to be available anytime soon. And, he said, ‘It doesn’t necessarily show that it improves school-relevant learning skills such as arithmetic.’”

Developing curiosity, love of learning, self-direction, and open inquiry, are difficult to define and measure. Developing curiosity et. May may be considered massively fluid partly because of measurement difficulties. Those goals have been neglected by schools and universities. The desire for certainty often contributes to teachers and professors avoiding nonsense because being certain has been programmed into teachers and professors. As a result, what occurs in many school and university classes has changed little in over 100 years.

Politics have changed yet Political Science scholars state they never would have guessed the fall of the Soviet Union would come about as it did. It made no sense before the fall. It was inconsistent with the paradigms they held. The fall of the Berlin wall was a “punctuated moment” which caused a shift in thinking. Shifts in thinking cause people to do things differently. Many teachers and professors might now consider whether a shift in thinking would be helpful for an increase in powerful learning. We are approaching a punctuated moment, yet we have been trained to wait for others to do something about it.

Newness here and there has rarely been found in schooling. What experiment about teaching and learning would equal what Nobel Laureate, Dr. Sam Ting, said about an upcoming physics experiment? “The discovery of a single atomic nucleus heavier than anti-helium could mean there was an anti-star or maybe a whole anti-galaxy somewhere.” Searching for something unusual like an educator’s equivalent to a mathematician’s zero would be exciting.
Researchers at Arizona State University have a grant from The Defense Department’s DARPA which now wants soldiers to have transcranial ultrasound-enhanced helmets. These helmets would allow soldiers to maintain mental acuity and stimulate certain regions of the brain. The helmet would manipulate brain functions to boost alertness, relieve stress, or even reduce the effects of traumatic brain injury. Previously deep brain stimulation required brain implants to stimulate neural tissue. May students, at some future time, wear helmets to stimulate mental acuity?

Dr. Vest, president emeritus of MIT said: Researchers at Delft University in the Netherlands, are developing bacteria-laced concrete. When cracks form, the bacteria wake from dormancy and secrete limestone, in effect healing the concrete. In 2011, Dr. Vest expects, more of these lifelike designs will come to light, and they will keep coming for many years.

Japan’s Foresight Survey he has gathered the country’s top minds to map out Japan’s advances over the next 30 years. They predict what will occur on or before the following dates:

- 2022 synthetic blood makes donation unnecessary.
- 2026 domestic humanoids become common.
- 2028 smellavision—television that produces tastes and smells appears in many living rooms.
- 2030 artificial intelligence is able to form opinions on movies, books, and art.
- 2033 stem cell techniques can produce artificial organs.
- 2035 commercial flights are 100% autopilot.
- 2037 seismologists can predict earthquakes magnitude 6 and up to a year in advance.

The functioning of schools and many university classrooms has not yet noticed a need for a paradigm shattering event, a punctuated moment, but it is becoming increasingly clear that the long period of stasis and coerciveness of classroom activities will need dramatic change as Bertrand Russell and Albert Einstein suggested. Bertrand Russell said: “We are faced with the paradoxical fact that education has become one of the chief obstacles to intelligence and freedom of thought,” and Einstein spoke of the modern methods of instruction strangling inquiry. (Russell was talking about schooling when he used the word “education.”) Mark Twain’s stated that schooling interfered with his learning.

This writing plunges into the notion that focusing on nonsense can help generate more sense. Focusing on the nonlinear and multi-linear can help generate greater linearity and/or acceptance of some nonlinearity. Focusing on disorder can generate more order, and focusing on fuzzy thinking and confusion can generate more clear thinking and mental fusion (synthesis).

My research on functional discontinuity is similar to “disorienting dilemma,” a term used by Jack Mezirow of Columbia University Teachers College. Generating a mental fusion (seeing a bigger, more open set of events) will not often arise unless one deals with confusion. The terms, functional discontinuity, disorienting dilemma, perplexity, stuckness, and confusion may be representative of what some consider “nonsense.”
Mezirow applies this to adult learning. My experience with adults, high school students, and middle grade students has demonstrated that disorienting dilemma applies to students as low as grade three, and perhaps even grade one at times. He says that this disorienting dilemma “helps you be critically reflective of assumptions you have acquired.” Wrestling with confusing ideas may help us question the present assumption that schooling helps increase our ability to function well. The opposite may be true when schooling dispenses information before students have questions. Jerome Bruner found that young students can learn concepts in an intellectually honest way (concepts formerly taught in graduate schools), if the concept is placed in terms of young students’ limited vocabulary, and if the concept is related to what they already know.

Barbara Strauch, NY Times, report’s on Kathleen Taylor’s brain research. Taylor is a professor at St. Mary’s College of California. Strauch says: “One way to nudge neurons in the right direction is to challenge the very assumptions they have worked so hard to accumulate while young. With a brain already full of well-connected pathways, adult learners should ‘jiggle their synapses a bit’ (what a disorienting dilemma and functional discontinuity do—my note) by confronting thoughts that are contrary to their own.’ The brain is plastic and continues to change, not in getting bigger but allowing for greater complexity.” What she says of adults can apply to children. Jiggling synapses/dealing with nonsense is a way a brain invents itself. Jiggling by suggesting that education as process is more powerful than delivering static content is helpful.

How many advances can a human brain make? What are the farther reaches of thought? Many years ago, O.K. Moore explored the upper limits of human learning with his Responsive Environments Laboratory. His students were ages three and four, (perhaps some were age two). Moore had three teachers per student and very expensive computer systems. Money was no object in his exploration of the upper limits of human learning.

As you notice what he reports of student achievement, ask yourself by what grade in school these students achieved that much. He said of their achievement: 1. they had a genuine thirst for learning, 2. they would create their own assignments. 3. They had a mastery of punctuation and spelling. 4. They had a vocabulary that excelled that of most college students.

If you were to guess they achieved that much by the fifth grade you would probably be amazed. They did, however, achieve that by the time they entered the first grade. First grade is correct. Learners and teachers were in a freer, responsive, environment. They studied what was naturally puzzling to them with the assistance of three teachers per student and expensive equipment. Their learning, at times, had the effect of dealing with the process of “mildly disorienting dilemmas.” These disorienting dilemmas were functionally discontinuous, and the function was the process of creating a greater continuity (conceive a bigger picture while being open to further expand it). Their social and emotional lives were studied and they were found to be emotionally well adjusted with their extraordinarily “high” achievement.

This is strong evidence of the power of the human mind which we have not yet adequately explored in schools and universities partly because of teachers
primarily delivering content. Brain researches, as far as I know, have done little about studying student freedom to learn, in an ungraded environment with fMRI scans while students are openly inquiring (a process). Demanding more requirements (national standards that more than 40 states will use—more coercion) does not generate more achievement in developing higher level thinkers. Schools and universities have not tried disorienting dilemmas/functional discontinuity on a wide scale, perhaps because schools and universities are too interested in being certain and overly accountable in a trivial, often inconsequential manner. Business leaders have found that relinquishing control and giving employees considerable autonomy can boast innovation and success. The Harvard Business Review (digital) 2/3/10 reports:

In chaotic times, an executive’s instinct may be to strive for greater efficiency by tightening control. But the truth is that relinquishing authority and giving employees considerable autonomy can boost innovation and success at knowledge firms, even during crises. Our research provides hard evidence that leaders who give in to the urge to clamp down can end up doing their companies a serious disservice…We’ve found that contrary to what many CEOs assume, leadership is not really about delegating tasks and monitoring results; it is about imbuing the entire workforce with a sense of responsibility for the business…

Relaxation of control can benefit any knowledge company, but particularly in certain circumstances: when the organization begins to miss opportunities because it can’t understand or respond to market demands; when work is impaired because employees feel excessively pressured and harbor dissatisfaction; and when crises imperil the business. Then mutualism is the best way to unleash the power of employees’ creativity. (Note again the earlier mentioned research on trust). A.D. Amar (ad.amar@shu.edu), Carsten Hentrich (chentrich@csc.com) Vlatka Hlupic (hlupicv@wmin.ac.uk).

Creativity of students has been found to be lacking at least since 1990. (Even in the 1950’s and early 1960’s the American Psychological Assn. President, Guilford, noted the appalling neglect of creativity. Liberal arts study has a tendency to increase creativity. Partly because of less emphasis on creativity, Roger Baldwin, a Michigan State University researcher has shown the number of liberal-arts colleges dwindled from 212 in 1990 to 136 in 2009. It seems that students and universities are not trusting the liberal arts, and the generation of big ideas to help them in their job efforts. Part of that lack of trust arises from the elite’s avoidance of (the difficult to measure) process and big, mind transforming ideas. This avoidance helps program students and citizens to maintain the status quo which avoids education as process.

Free schools which do with students what these advanced business leaders do with the employees, find that students are more successful and more innovative. Teachers and professors could profitably learn from some innovative business leaders and Nobel laureates.
I suggest that more teachers and professors ought to be shocked by thinking their primary job is to deliver content to students. Effective teaching is a process so much more than being like one who delivers the mail, yet delivering content is the common teaching mindset. Bill Smoot’s (*Conversations With Great Teachers*) research also supports that teaching is so much more than telling.

Teachers and professors often think they can be most certain and accountable by measuring clearly defined separate events. These events are often trivial (when unasked-for) yet we have not yet decided to move away from the presently closed “teacher telling/covering content” approach in schools and universities because of the desire for excessive certainty. Consciousness levels (Tononi’s phi) are not often considered by many teachers and professors, nor is the difficult to define “process.”

Not long ago psychologists thought that 40 percent of brain cells are lost as we age. That is not so. Strauch states: “What is stuffed into your head may not have vanished but has simply been squirreled away in the folds of your neurons. Recently, researchers have found even more positive news. The brain, as it traverses middle age, gets better at recognizing the central idea, the big picture. If kept in good shape, the brain can continue to build pathways that help its owner recognize patterns and, as a consequence, see significance and even solutions much faster than a young person can. The trick is finding ways to keep brain connections in good condition and to grow more of the cells.”

The brain is plastic and continues to change as Sharon Begley so ably states in *Train Your Mind: Change Your Brain*. She has demonstrated that brains can invent themselves (a process). About age and the brain, Immanuel Kant wrote some of his profound material when he was age 80.

Often children as low as grade three, or even lower than grade one, need to bump up against people and semi-confusing ideas that are different from what they presently hold.

What is later said about functional discontinuity, what Malcolm Gladwell might refer to as structured disadvantage, creates the disorienting dilemma about which Mezirow speaks. This writing elaborates on the need for disorienting dilemma, functional discontinuity, structured disadvantage, as a way to moving minds to higher levels and bigger pictures. Functional discontinuity can assist the brain to invent itself. More sense can be made by focusing, at times, on nonsense. Self-direction is a process in which the brain invents itself. The limits of the size of a continuity (an event) and/or how much sense is possible will also be explored.

Sense frequently arises from paying attention to nonsense for adults and children. Larger continuities arise from paying attention to discontinuities. Teachers and professors desire for certainty provides a condition for teachers and professors to know some things or events which, often in an unaware way, prevent them from learning other things and events. (Knowing everything is made of matter and energy prevents inquiry into what isn’t matter or energy). Knowing the earth was the center of the universe, prevented knowing it wasn’t (before Copernicus).
Social science researchers frequently desire to follow the precision of physicists. What educators and many social scientists seem to not notice (or forget) is that physicists are now rather uncertain about the universe. Not knowing the composition of 96% of the universe seems to be what many physicists are now accepting as they attempt to penetrate more of the mysteries (something like nonsense) of the universe.

Mysterious events are not frequently considered by teachers and professors in their classrooms. The present outdated paradigms surrounding teaching brings teachers and professors to think their job is to know the content of their field and to deliver it to students. Teachers and professors often think students can’t inquire until they have the facts (content) of the course they are teaching. Schools and universities have been content oriented for over a century. Outdated mindsets are often unquestioned yet a wide variety of research implies that schools and universities could profitably change classroom activity based on the other changes that have recently occurred. Some scholars say that Gottfried Leibniz was the last man to know it all” (early 1700).

Powerful quantum computers are just around the corner. Non powerful quantum computers already exist. (An example cited by Google): “A classical computer might need 500,000 peeks on average to find a ball hidden somewhere within a million drawers. But a quantum computer could find the ball by just looking into 1,000 drawers—a nice little stunt known as Grover’s algorithm.” A digital common computer compared to a quantum computer has been likened to a firecracker and an atom bomb. Almost unimaginable, but not quite.

We all know “change.” Change may be occurring so rapidly that we no longer know the effects of rapidity of change. At one time physicists divided the world into matter and energy. The universe is now divided into more than matter and energy as physicists now look for a Higgs boson; that which gives matter mass; that which has not yet been found, and that which physicists call the “God Particle.”

More on the process of change—Wired Magazine reports radical change in future eating: “On the fringes of how we might eat in the future lies an idea from the celebrated scientist Robert Freitas, whose putative nanorobots, powered by a radioactive gadolinium isotope, would patrol every cell in the human body and supply energy to cells directly so that it needn’t come from food. This would only replace food’s caloric aspect, so we’d still need to take vitamin and nutritional supplements in order to provide the body with new matter as cells die off, according to Patrick Tucker, director of communications for the World Future Society. Still, there’s a certain cold comfort in knowing that if worse comes to worst, nanotechnology might give us a food pill that, taken every 10 years or so, would power our bodies if the planet loses the ability to do so—or if we’re forced to leave the planet, as Stephen Hawking suggests.”

Teachers and professors often describe and explain. Descriptions and explanations are given in terms of known categories. We can divide the world into static or dynamic—classic or romantic—conservative or liberal—closed or open, and perhaps billions of other ways. When an event can’t be described or explained,
categories are often created in attempts to describe or explain. Too often schools and universities teach us to think that if we name “it” we know “it.” We can name everything “universe,” yet do we know it? Physicists say that we now know less than 5% of the universe. As far as we know, the universe has no middle or no edge, but notice the difficulty in conceiving an event with no boundaries. Conceptions as we know them, have boundaries. Process is unbound.

Todd May, The Lemon-Calhoun Chair of Philosophy, Clemson University, states in his *Gilles Deleuze: An Introduction*: “Consider the possibility that there is more to our world then we can perceive, and more than we can conceive. Suppose the world overflows the categories of representation that the dogmatic image of thought imposes on it. This is not to say that our particular categories are lacking something that other, better categories would give us. Our imagination must go further than that. We need to consider the possibility that the world—or, since the concept of world is too narrow, things or being or what there is—outruns any categories we might seek to use to capture it.”

In the past, bigger and better categories have helped us describe and explain more but as May remarks: “Our imagination must go further than that.” What follows is an attempt to provide conditions, not for new categories, but to open minds to the possibility of the power of knowing more tentatively: knowing with less certainty; knowing as a process that may help us know more by being more receptive to what now seems near impossible. As Sir Arthur Eddington said: “The universe is not only stranger than we imagine; it is stranger than we can imagine.”

Recent research offers hope for improving student learning. Recent findings in neuroscience and in a variety of fields indicate some relatively rapid change is needed in what we do in schools and universities, if our brains will develop fast enough to adapt.

Those who have used high-quality voice recognition programs have experience with machine learning. Machines are already learning to learn. The New York Times reports: “the most advanced models are fully autonomous, guided by artificial intelligence software like motion tracking and speech recognition, which can make them just engaging enough to rival humans at some teaching tasks. Researchers say the pace of innovation is such that these machines should begin to learn as they teach, becoming the sort of infinitely patient, highly informed instructors that would be effective in subjects like foreign language or in repetitive therapies used to treat developmental problems like autism.” But this development is still in its infancy.

Progress being made with quantum computing indicates that within five years we may have more powerful quantum computers. With their ability to learn, some day in the not-too-distant future quantum computers will be 1 million times more “powerful” than the ones we now use. With their increased ability of learning to learn, it is difficult to predict how humans may use them. In 2011 affective programming is making gains to make computers more “sociable.”

By 2049, Ray Kurzweil predicts, “Man will become one with machines.” His book the *Singularity Is Near*, prompted a group to create Singularity University (SU).
Kurzweil believes Singularity University is not a religion but an academic institution though it is not one to rival MIT or Caltech. (Cal Tech at one time did—and maybe still does—allow students follow their muse (and their students were highly successful). Other schools and universities could profitably follow Kurzweil’s view of creating generalists so that more of what has been taken apart may be reassembled into broad, general wholes.

Following Alfred North Whitehead’s suggestion to generalize after studying a specialty, is one way to becoming a generalist. Focusing on nonsense may help one make more sense. Focusing on nonsense/discrepancies is often helpful in making more sense. Schools and university classes now often only study a specialty, partly because their teachers and professors are primarily specialists, not comprehensive generalists even though they may have a doctor of philosophy degree. About this Einstein said: If we knew what we were doing it wouldn’t be called research.”

The 6/12/10 NY Times mentioned: “A time, possibly just a couple decades from now, when a superior intelligence will dominate and life will take on an altered form that we can’t predict or comprehend in our current, limited state. …At that point, the Singularity holds, human beings and machines will so effortlessly and elegantly merge that poor health, the ravages of old age and even death itself will all be things of the past.”

The ASCD reports: “Author Marilee Sprenger illuminates the challenges of classroom teaching in the digital age. She explains that 99% of incoming information to the brain is dropped or discarded. ‘Given the quantity of messages bombarding the brain,’ writes Sprenger, ‘Anything that is not familiar, does not make sense or is not associated with survival may be quickly disposed of.’ The implications for teachers to reach students above the “din of competing information is profound.”

Acting differently, teachers and professors would profitably become hesitant to give answers before students had questions. The answers teachers and professors give (often lectures) are not often answers to what students find remarkable, interesting, and important. Many teachers and professors may now profit from a punctuated moment where they see there would no longer be excessive teacher or professor telling so that students could better think for themselves. Students now often do not have questions about the topic they are studying, even though the teacher’s topic is often not interesting to many students. “Student” questions are often, “How many pages do I have to write? Or “Will this be on the test?” “Learner” questions are often about the nature of a remarkable topic of interest.

Other examples of rapidity of change teachers and professors could profitably notice are within 25 years it is predicted we will have brain implants which produce thought activated Google searches. Woody Tasch said: “We live in a world of ever-depleting resources. Money is no longer the currency. Air, water and soil are the currencies for the future.” The Dawning Nebulae, based at the National Supercomputing Center in Shenzhen, China, has achieved a sustained computing speed of 1.27 petaflops—the equivalent of one thousand trillion mathematical operations per second. Another source said a new Chinese super computer (Tianhe-1A) can perform mathematical operations about 29 million times faster than one of
the earliest supercomputers, built in 1976. For the record, it performs $2.5 \times 10^{15}$ mathematical operations per second.

These predictions imply a need for tolerance of ambiguity. Intolerance of ambiguity generates an excessive emphasis on specialized concepts, avoidance of process, and the need for certainty. This emphasis occurs because the complexity of generalized thinking has forced leaders and citizens to be uncertain about the existence of congested complexities (big ideas and processes often considered nonsense by those wanting certainty).

Complex thinking is often considered to be chaotic and nonsensical. Until recently, behaviorists had many of us believing that only if something could be directly sensed did it exist. This implied that mind, beauty, intent, wisdom, openness, and quality did not exist in any public sense.

Schools and universities have been excessively intolerant of ambiguity because of an original mistake; the need for certainty. Were schools and universities more tolerant, they would consider what CEO Dev Patnaik said as reported by Nipun Mehta: “Wired to Care: How Companies Prosper When They Create Widespread Empathy,” he argues … “It is not the lack of innovation that hampers companies, but the ‘empathy gap’—the chasm between employees in organizations and the people that they serve. Companies, he said, ‘do a good job of stamping empathy out of employees, then are surprised when employees make poor decisions or try to sell things that people don’t need.” Schools and universities often do the same.

The opposite of intolerance to ambiguity is promoted by the use of functional discontinuity (a mind-opener). Functional discontinuity puts a gap in a student’s knowledge structure. (Mental gap’s may temporarily be considered “nonsense.”) The seemingly nonsensical functional discontinuity is a condition for the process of open inquiry in a freer, responsive, ungraded environment.

Less certainty is noted in pass/fail grading. The NY Times reported that “Harvard and Stanford, two of the top-ranked law schools, recently eliminated traditional grading altogether. Like Yale and the University of California, Berkeley, they now use a modified pass/fail system, reducing the pressure that law schools are notorious for. This new grading system also makes it harder for employers to distinguish the wheat from the chaff, which means more students can get a shot at a competitive interview.”

Steven Tedesco, Journal of Unschooling and Alternative Learning, Volume 5, Issue 9, Fall, 2010, states: “The arguments presented reveal how disturbing and damaging grades are in education in general, not to mention in higher education. By reflection on my personal experiences, I have had a chance to explore how grading in a terminal degree program has already conditioned me to act, speak, and participate in ways which I would not if grading didn’t exist. Through my reflection and with the support of relevant literature, I have come to conclude that grades serve no purpose in terminal degree programs whatsoever.
I think that the most fitting end to this discussion is to read the words of Paul Dressel who elegantly reveals the utility of grades: ‘A grade can be regarded only as an inadequate report of an inaccurate judgment by a biased and variable judge of the extent to which a student has attained an undefined level of mastery of an unknown proportion of an indefinite amount of material.’” (Dressel, 1957, p. 6)

Nipun Mehta reported: “How Nonsense Sharpens the Intellect.” Mehta reports Alexander Hafemann said: “In a series of new papers, Dr. Proulx and Steven J. Heine, a professors of psychology at the University of British Columbia, ‘suggests that, paradoxically, this same sensation (experiencing nonsense) may prime the brain to sense patterns it would otherwise miss—in mathematical equations, in language, in the world at large. (They argue these findings) ‘are variations on the same process: maintaining meaning, or coherence. The brain evolved to predict, and it does so by identifying patterns.””

“When those patterns break down… the urge to find a coherent pattern makes it more likely that the brain will find one.” What is made functionally discontinuous (through noticing a discrepancy, an anomaly, disorienting dilemma, or perplexing situation) can generate a larger continuity. J. Richard Suchman also found that to be true years ago as reported in his Illinois Studies on Inquiry.

Hafemann also wrote: “Brain-imaging studies of people evaluating anomalies, or working out unsettling dilemmas, show that activity in an area called the anterior cingulate cortex spikes significantly. The more activation is recorded, the greater the motivation or ability to seek and correct errors in the real world, a recent study suggests. ‘the idea that we may be able to increase that motivation,’ said Dr. Inzlicht, a co-author, ‘is very much worth investigating.’”

Functional discontinuity generates moderate perplexity, mental stuckness, and a sense of wonder from which open inquiry arises. To help remove constraints surrounding the outdated obedience to authority mindsets in many classrooms, and to help notice the value of self-directing mind opening and awareness enhancement, a condition of functional discontinuity in a freer, ungraded environment could profitably be given much attention. As Ralph Waldo Emerson said: “ People wish to be settled. Only as far as they are un-settled is there any hope for them.” Moderate unsettling (providing a condition for a student to notice a mental gap—a discontinuity—) can function to help generate open inquiry. Later, one may notice a peaceful unsettling helps one be more peaceful in an openly semi-settled way.

The use of functional discontinuity when teaching is secular, yet some of the goals could be interpreted as trans-empirical. (Some hold that a trans-empirical goal is nonsense), perhaps the opposite of the obedience to authority type goals. Is finding meaning from experience, at times, seen as arising from experiencing puzzlement? Some goals and outgrowths of this kind of teaching are the generation of that which explains discrepancies, or helps one better accept unexplainable
discrepancies. Some students, when openly inquiring, discovered what 
psychotherapist, James Guinan found to be powerful stem qualities. (Not to be 
confused with other stem programs—science, technology, engineering, and math.) 
The word stem and stem qualities refers to the mental equivalent of physical stem 
cells. Physical stem cells can generate all or most other body cells. Stem qualities 
mentioned below can help a brain invent itself. Guinan’s stem qualities are:

1. Increase the tendency to let things happen rather than make things happen.
2. Have frequent attacks of smiling.
3. Have feelings of being connected with others and nature.
4. Have frequent, almost overwhelming, episodes of appreciation.
5. Have the tendency to think and act spontaneously, rather than from fears 
based on past experiences.
6. Have an unmistakable ability to enjoy each moment, and to make the best out 
of each experience.
7. Lose the ability to worry.
8. Lose interest in conflict.
9. Lose interest in interpreting the actions of others.
10. Lose interest in judging others.
11. Lose interest in judging self.
12. Be compassionate to self and others without expecting anything in return.

The power of stem quality 1. (increase the tendency to let things happen rather than 
make things happen) frequently permits the other eleven stem qualities to arise. It 
is an example of being peacefully natural. It is difficult to be a natural because 
schools, universities and society often pressure students to be “more than they are, 
or other than they are” rather than use their natural power to learn to be 
increasingly self-directing. A self-directing person invents his own brain and 
accepts what is (that can’t be changed) as it is, without a need to change it.

A way of looking at being a natural learner, rather than one pressured to change 
by outside authority, is a precisely stated outgrowth of stem quality 1. Amplified 
by Deepak Chopra in the notes section.

As was mentioned, the other less educational version of stem teaching is also 
understood as, science, technology, engineering, and mathematics. An ASCD 
report said: “But creative types are working valiantly to turn STEM into 
STEAM—with the A standing for the arts. At the Boston Arts Academy, for 
instance, the arts are infused in every subject. While creative pursuits are often the 
first to go when budgets are cut.”

Elizabeth Stage, the director of the Lawrence Hall of Science at the University 
of California, Berkeley, said: “… What’s central about science and how that 
overlaps with technology, engineering and math,” should be considered. Dr. 
Stage thinks it’s a “false distinction” to “silo out” the different disciplines, 
(STEM of science, technology, engineering, and math) and would much prefer 
to focus on what the fields have in common, like problem-solving, arguing 
from evidence and reconciling conflicting views. “That’s what we should have 
in the bulls’-eye of our target.” (More like process.)
Classroom management, taught to most secondary and elementary teachers, and expected by most university professors, seeks power and control over students. As power and control by teachers and professors in classrooms is so pervasive, and has gone on for such a long period, its coercive force is barely noticed. This coercion prevents natural learning, and is one of the reasons schools and universities need transformation.

The value of self-direction as a motivator is mentioned by Daniel Pink who reports on older research (by Gluxberg) in which subjects were to place a candle on the wall using tacks, light the candle, and not have the wax drip on the wall. The small pile of tacks was in a small box on a table with matches and a candle beside the box. One group was given the task to be the norm group to determine how much time people would take to solve the problem. The second group was incentivized by paying them money with the fastest solution getting the most money.

The research found the problem was solved most quickly by the group with no incentives; the “norm” group. The reward for the norm group was intrinsic motivation. The reward for the second group was extrinsic motivation and they scored more poorly than the group with internal motivation. Where the rewards were highest, the worst performance (took the longest to solve) was the group with the highest external incentive (offered the most money). This research has been verified numerous times. The solution was to place the edge of the box on the wall with several tacks, then place the candle in the box and light it. Learning for its own sake is intrinsically motivating.

Pink reports that the conditions of autonomy/self-direction works as a much better incentive than external reward such as money. Grades and degrees are external rewards similar to money. Schools and universities continue to use grades and degrees as an external rewards. This research indicates that grades and degrees do not work as well for solving more difficult problems. For very clearly defined simple problems, external rewards are a workable incentive (workable but often trivial which may be why schools are sometimes boring, inconsequential places that need transforming).

When the problem to be solved is clear and easy, such as when the tacks are placed on the table outside the box, the problem is much easier and the speed of the solution is greatly improved. If schools and universities are to prepare students for the real world of more complicated problem solving, intrinsic motivation, (self-direction/autonomy) has been shown to work best, yet older coercive ways remain common partly because of habit, need for certainty, and lack of awareness.

The term “education,” as used here, seeks to develop curiosity, creativity as well as kindness. Education leads to what is similar to the Chinese word “hsin,” which integrates the mind and heart into a unit. Van Rossum and Hamer’s learning and knowing levels 4-6 does the same. “Training” operates at the three lower levels. Few professors or teachers have these goals in their daily lessons plans. Arne Duncan, Secretary of Education, has said that many, if not most, teacher-training programs are mediocre. Mediocre perhaps because the coercive telling and grading turn off curiosity.
CHAPTER 2

About our values, Nicholas Kristoff reports: “We are now (summer 2010) spending more money on the military, after adjusting for inflation, than in the peak of the cold war, Vietnam War or Korean War. Our battle fleet is larger than the next 13 navies combined, according to Defense Secretary Robert Gates. The intelligence apparatus is so bloated that, according to The Washington Post, the number of people with “top secret” clearance is 1.5 times the population of the District of Columbia. Meanwhile, using evidence and reconciling conflicting views. “That’s what we should have in the bulls-eye of our target.” (More like process.)

from the College Board says that the United States, which used to lead the world in the proportion of young people with college degrees, has dropped to 12th.”

The goals of peace and goodwill among men are often held by educated people. As Einstein said: “Nothing that I can do will change the structure of the universe. But maybe, by raising my voice I can help the greatest of all causes - goodwill among men and peace on earth.”

Rick and Bill Ayers say: “Schools that claim to reflect the “American values” also deny kids the right to speak, submit them to endless surveillance and unreasonable random searches; they insist that no one fight in school even as the school itself is militarized and turned into a race of war recruitment… As education is increasingly framed as a commodity purchased in the marketplace rather than a public good and the human right, is reduced to a social Darwinist model of competition, sorting, and external criteria for success, and is desperately enacted in classrooms across the country. We are told repeatedly that we benefit from the greatest democracy and the greatest amount of freedom that makes us the envy of the world, while in our schools we see the iron hand of authoritarianism—more intrusive, more demanding, more concerned with the tiniest details of education.”

We often look for certainty with numbers. Numbers can be counted, but as Einstein further said: “Not everything that can be counted counts, and not everything that counts can be counted.” Within the other stem learning, math is overly pushed at the expense of literature, music and art because math, it is often thought, provides more certainty than literature, music and art. Einstein, however, also said that the laws of mathematics, insofar as they are certain, do not relate to reality, and insofar as they relate to reality, they are uncertain. Godel proved nothing can be proved.

Evidence will later be provided to show that schools and universities do what they do more for the economy than for higher-level student learning. The economy functions well when things are more certain. In the past, yes, but not today. Enter greater risk-taking. It is often the need for certainty that prevents schools and universities from taking risks to develop higher-level independent thinkers. Process can’t be counted. Logic is not one but many. This year more information more information will be distributed than there was in the last 5,000 years. What to ignore is learned through education rather than only training. Information overload generates poor decision-making.